Making Connections:

Academic Language and Mathematics for English Learners
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Increasing numbers of English Language Learners in California mandate that all classroom teachers develop instructional practices that allow multiple entry points and multiple pathways to mastering content knowledge while promoting Academic Language Development throughout the day.

In this module, participants will review current research regarding teaching and learning for English Language Learners and discuss implications for current classroom practice. They will analyze existing instructional practices and practice ways to modify them to enhance support to English Language Learners in both content and language objectives. Participants will internalize a framework for weaving academic language development throughout mathematics lessons.

This workshop is designed around themes that are drawn from current research about English Language Learners. The themes are used to integrate content knowledge and language learning to increase student access to the mathematics curriculum. Theme One focuses on current research on English Language development and assists participants to internalize this research into their daily lesson planning. The remaining themes focus on instructional practices and how to provide explicit language and content input to increase student language and content output. This workshop includes the use of video clips to bring to life the process of integrating action research and instructional practice.

This module was developed by a team of seven teacher leaders experienced with English Language Learners and supported by Doreen Heath Lance, Joni Easterday, and Jane Escobedo at the Sonoma County Office of Education.

Teacher Leaders

Tomas Acuña, Teacher ....................................................... Cali Calmécac School, Windsor
Maas Anderson, Teacher ........................................................ Roseland School, Santa Rosa
Alma Conde, Teacher .................................................. Luther Burbank School, Santa Rosa
Guy Cottle, Teacher .................................................... Luther Burbank School, Santa Rosa
Sophia Diaz, Teacher .............................................................. Bellevue School, Santa Rosa
Ross Hause, Teacher .................................................... Luther Burbank School, Santa Rosa
Ed Locker, Teacher ............................................ Albert F. Biella Elementary School, Santa Rosa
Alfonso Salinas, Teacher ................................................... Cali Calmécac School, Windsor
<table>
<thead>
<tr>
<th><strong>Lesson Summary</strong></th>
<th><strong>Lesson Goal</strong></th>
<th><strong>Focus Questions</strong></th>
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<tbody>
<tr>
<td>Lesson Study is a vehicle to study the effectiveness of EL strategies in the math classroom. Participants will learn to effectively integrate language support scaffolds into a mathematics lesson.</td>
<td>1. Participants will review current research regarding teaching and learning for English Language Learners and discuss implications for current classroom practice. 2. They will analyze existing instructional practices and modify them to enhance support for English Language Learners in both content and language objectives. 3. Participants will internalize a framework for academic language instruction in mathematics.</td>
<td>What does research tell us? What are the important language elements? What are the important math elements? Where do they come together? Are the strategies strong enough to apply to any lesson? How can we use this process to continue to find ways for the English Language Learner to learn mathematics?</td>
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**Materials**
- Tangrams
- California Math Framework
- Chart paper
- Markers
- CD with video clips

Purchase one per participant: *Fifty Strategies for Teaching English Language Learners* by Adrienne L. Herrell (Merrill Education products, www.merrilleducation.com)

**Participant Pages**
- Please see presenter slides and pages with notes for talking points.

There are no overheads for this workshop. All media is included on CD.

Prepare ahead

Carefully review presenter notes to ensure understanding of the Mathematics and Academic Language framework.
<table>
<thead>
<tr>
<th>Mathematics Framework for California Public Schools</th>
<th>Instructional Materials Connections</th>
<th>Notes</th>
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<tr>
<td>How does the mathematics framework, instructional materials, and this module amplify and support: Teachers using a repertoire of good instructional practices?</td>
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<td>How does the mathematics framework, instructional materials, and this module amplify and support: Teachers using precise, accurate mathematical language?</td>
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## Mathematics Framework for California Public Schools

### English Language Development

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<td>How does the mathematics framework, instructional materials, and this module amplify and support: Students communicating mathematical understanding orally and in writing?</td>
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<td>How does the mathematics framework, instructional materials, and this module amplify and support: All students achieving standards?</td>
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### The English Learner (EL) Achievement Gap

#### Statewide

% of students at or above the 50th percentile - Math SAT 9 2002  
% of students proficient or above - Math CST 2002

<table>
<thead>
<tr>
<th>Grade</th>
<th>English Only SAT 9</th>
<th>EL SAT 9</th>
<th>English Only CST</th>
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#### Sonoma County

% of students at or above the 50th percentile - Reading and Math SAT 9 2002  
% of students proficient or above - Reading and Math CST 2002

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*CISC/UCOP Mathematics Support Modules*
Anyone involved with schools — especially urban schools — knows firsthand how often discussions of bilingual education generate more heat than light. In such a politically charged context, it is often difficult to know where to look for up-to-date and fair summaries of what research is discovering about best practices. We think that the following review by Russell Gersten and Scott Baker brings some needed illumination to this controversial area. Our hope is that educators and administrators working in urban schools will find this synthesis of research to be of immediate relevance and usefulness. To that end, we also asked Dr. Patrick Teicher to introduce this document by sharing his perspective as an administrator in a large urban district that deals with this issue on a daily basis.
Introduction by Patrick Teicher

As a general educator responsible for a large school district’s special programs, bilingual education has presented a special challenge. In my experience, I have found bilingual program leaders to be highly committed and knowledgeable, but suffering greatly from a lack of acceptance by their general education teacher and administrator peers. Most general educators have very little knowledge about bilingual education and view it with the suspicion and prejudices of the general public. The bilingual teacher is torn between a loyalty to support native-language instruction and culture and a constant pressure from those around them to get their students speaking English as soon as possible. This lack of acceptance and confusion over many years has resulted in extremely low staff morale and high turnover of staff. It also seems to have resulted in bilingual professionals taking political sides on professional methodology rather than having the freedom (and energy) to explore strategies for improvement. It would seem that bilingual education has become a parallel system much as special education was in all but very recent years.

As a supporter of bilingual programs, I have done what I could to embrace and assist the program, but it has been very challenging for all the reasons stated above. Bilingual staff have recently been especially sensitive when criticized about results of “their students” on high-stakes academic performance measures. The new pressure of high-stakes performance measures has “ratcheted” up the pressure on bilingual staff to get their students speaking English faster and earlier, and has frustrated even further staff loyal to native-language instruction and culture. However, this pressure on bilingual staff to get their students speaking English faster and earlier, while frustrating, may have a silver lining. A positive outcome of the high-stakes performance push, ironically, has been the realization that improvement of all student populations is necessary if a school or school district is to improve its academic report card. This compulsory “inclusion” may be a powerful catalyst to bring resources, help, and increased acceptance to bilingual educators and their students. It may also be a driving force to lift expectations for limited English-proficient students.

Efforts to improve the current bilingual program have been thwarted by frustration and confusion within the field. I am thankful to Gersten and Baker for providing us with a thorough review of bilingual education research and practice in the United States. As an administrator, I feel that they have provided me with a better-balanced perspective of bilingual instructional practices. Reading their article has also made me appreciate the wealth of research done recently in the area of specific methodologies for increasing the literacy and skills of limited English-proficient learners. I believe Gersten and Baker have provided valuable insight into how we might begin to provide new hope for bilingual education instruction.

Patrick Teicher, Ph.D., is the Assistant Superintendent for Student Services, Northside Independent School District, San Antonio, Texas.

Practical Implications

Gersten and Baker’s review of the research suggests that good bilingual programs do the following:

1. Anchor curriculum goals to vocabulary development
2. Develop teachers’ awareness and provide them with resources to allow the strategic use of visual aids in their instruction to reinforce learning and retention
3. Use small-group cooperative learning and peer tutoring to enhance learning
4. Develop the skills of bilingual teachers to strategically use students’ native language to reinforce academic content learning
5. Use ongoing research as a resource for staff discussion around current and future program practices

The past several years have witnessed a virtual avalanche of events in the field of bilingual education that portend a significant shift in the way English-language learners are taught in this country. In April 1998, the Secretary of Education, Richard Riley, announced a major shift in federal policy, calling for the goal of English-language proficiency in three years for virtually all English-language learners. In outlining the government’s position, Riley asserted that “new immigrants have a passion to learn English and they want the best for their children” (Riley, 1998).

A survey conducted of 420 randomly selected members of the Association of Texas Educators, who represented educators both within and outside the field of bilingual education, found that the majority supported the government’s position. They felt English-language learners were spending too much time in native-language instruction (Tanamachi, 1998).

The views expressed by both the Department of Education and the sample of teachers are in stark contrast to the position of several noted scholars in the field, who believe that English-language learners should be taught all academic subjects in their native language for no fewer than five, and preferably seven, years (e.g., Cummins, 1994; Thomas & Collier, 1997). These scholars feel that extensive native-
PRACTICES FOR ENGLISH-LANGUAGE LEARNERS

...the real challenge for schools today is not the growing number of Latino/a children who speak Spanish (and must learn English), but the school’s continuing need to do a far better job of delivering instruction to them in English. This would entail that schools and teachers acknowledge and understand these children as second-language learners and develop quality, content-rich ESL programs for them... It also means that we must teach English reading and writing from a second-language perspective and not treat all Latino/a children as native English readers and writers (Jiménez, Moll, Rodríguez-Brown, & Barrera, 1999, p. 225).

Parental choice in the amount of English-language instruction each child receives, how early a child

language academic instruction is necessary for students to benefit from eventual instruction in English delivered in mainstream classrooms.

Recent events also indicate that some large schools districts (e.g., New York, Denver) and some states (e.g., California) are seriously rethinking how they educate English-language learners. Invariably, initiatives in these districts and states call for students to enter English-language instruction at a much earlier age. The initiatives also call for a significant reduction in the amount of native-language instruction provided. Lawsuits or threatened litigation in Sacramento, Denver, and Albuquerque have given us a sense of the emotional tenor of the debate.

The New York Times recently reported that “in response to years of criticism of the city’s bilingual education programs—which now serve 155,000 students speaking 145 languages—New York City plans to dramatically increase the amount of time devoted to English-language development” (Archibald, 1998). This is the most recent event in “New York’s long, torturous history (of bilingual education) with the subject, dating from the early 1970’s” (p. 2). The Times article concludes with a summary of major lawsuits.

Although the specifics vary from case to case, and region to region, increasingly parents and teachers (most notably Jaime Escalante and Gloria Tuchman) have begun to question the extremely small amounts of time devoted to English-language development in many bilingual education programs in the primary grades and the quality of English-language development instruction. A noted literacy researcher, Rosalinda Barerra, said that:

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Parental choice in the amount of English-language instruction each child receives, how early a child

is introduced to substantive English-language instruction, and when a child should exit classrooms that use large amounts of native-language instruction have consistently been raised as issues by advocacy groups. Despite the political and philosophical debate regarding best practice, the reality is that many English-language learners never receive any native-language instruction because it is not feasible.

The report by the National Academy of Sciences (August & Hakuta, 1997) on the state of education for English-language learners points to some of the effects of little or no native-language instruction in reading development, for example, by noting that, “It is clear that many children first learn to read in a second language without serious negative consequences. These include children who successfully go through early-immersion, two-way, and English as a Second Language (ESL)-based programs in North America” (p. 23). The authors also point out that “the high literacy achievement of Spanish-speaking children in English-medium Success for All schools (Slavin & Yampolsky, 1992) ... suggests that even children from low-literacy homes can learn to read in a second language if the risk associated with poor instruction is eliminated” (p. 24).

Full-time instruction in English is the approach routinely used with non-Latino English-language learners. In California, the state with the largest number of English-language learners, a recent Department of Education Census tells us that 31.4 percent of English-language learners are taught solely in English. An additional 21.6 percent receive sheltered instruction plus some native-language support, often through an instructional aide (California Department of Education, 1997). Others receive bilingual education with both a native-language component and an English-language component. The number of approaches and procedures is extensive.

It seems reasonable to expect that after so much attention and so many years of controversy and discussion, research would provide some answers to questions of how to best teach English-language learners. Among the commonly asked questions are:

- What age is best to introduce academic instruction in English to young English-language learners?
- To what extent—if any—does native-language instruction benefit the cognitive and academic growth of English-language learners?
- Which are the best instructional methods for English-language development?

Unfortunately, a realistic appraisal of the empirical database indicates that research findings have stubbornly failed to provide answers to the first two questions. The third question has not received the degree of attention from the research community it should (August & Hakuta, 1997), but the scant research base that does exist provides some initial answers.

In the next section, we address the first two questions. Despite the fact that no clear-cut answers can be provided to each question, we provide information on sensible approaches districts could implement. The final section addresses the third question: instructional approaches for supporting English-language development. Here, we summarize research-based information. Information we gleaned from a series of work groups conducted with educators throughout the United States is also included.
Two Models of Bilingual Education: Which Is More Effective?

A major source of controversy in the field of bilingual education is when to move students from native-language instruction into English-language academic instruction. Many bilingual educators believe that the transition to English-language academic instruction should be delayed until students have a good command of academic English (August & Hakuta, 1997; Goldenberg, 1996; Thomas & Collier, 1998), which requires command of their native language. Often they have argued that for the entire first seven years of schooling, academic instruction should be in a child’s native language (Thomas & Collier, 1997).

Wong-Fillmore and Valdez (1986) put part of the underlying rationale that drives this belief in stark terms: “If reading involves . . . texts of any complexity beyond that of street signs, it is not possible to read in a language one does not know” (p. 661). They feel that although students who are English-language learners can learn to read words in English relatively easily, they will “have considerably greater difficulty making sense of the materials they read” (p. 661). Proponents have argued that premature transfer of students into all-English academic programs interferes with the development of higher-order thinking (Krashen, 1982; Moll & Díaz, 1986).

A contrasting model of educating English-language learners centers on the idea that the transition to English instruction should be made as early as possible. The argument is essentially that students can acquire English while learning academic content, if English is introduced systematically and gradually. In learning to read, for example, Barrera (1983) wrote that “second-language reading can commence soon after native-language reading begins, or develop virtually alongside it, as long as the learner is making sense of the written language he or she encounters” (p. 170).

Other researchers (e.g., Anderson & Roit, 1998; Chamot & O’Malley, 1996) have argued that young English-language learners can benefit from this type of “sheltered” English-language instruction in subjects such as science and mathematics because they are excellent venues for cognitive growth and English-language development. Both disciplines involve many concrete objects, and virtually all students are learning a new vocabulary and the “language” of the discipline (Lee & Fradd, 1996).

It also may be true that more literacy-dependent academic areas, such as reading and writing, are better initial subject areas for sheltered English approaches. In noting that “language is a primary vehicle for intellectual development,” Echevarria (1995) laid out a convincing argument for Instructional Conversations, a potentially rich area of academic instruction in reading and language use for English-language learners. Instructional Conversations involves carefully directed dialogic interactions between teachers and students, and holds the assumption that increased oral language use by students during reading instruction will improve comprehension as well as language proficiency.

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are for a rapid immersion in English-language classrooms use the “no difference” finding as support for their position. Recently, a consensus has emerged that “focusing evaluations on determining a single best method of language instruction for English-language learners was probably the wrong approach [for the Federal government] to take” (August & Hakuta, 1997).

Michael Kirst of Stanford University also provided some valuable insight into the problems within the bilingual education knowledge base. In discussing California, he noted, “from its inception . . . in the 1970s, bilingual education has been oriented toward inputs, process, and compliance . . . . The assumption was if you have this input, the outputs would take care of themselves. So . . . (we monitor) . . . whether you mounted the program, and not its results” (Schneiberg, 1998, p. 16, italics added). Similar problems plague states such as Texas and Massachusetts. This concern with compliance as opposed to learning outcomes is at the heart of many of the current problems.

Several costly attempts have been made to assess whether bilingual education was effective and which model worked best. Many of these attempts have centered around large-scale studies involving extensive data collection in many communities. Invariably, the findings have been inconclusive, in part because all of the studies have been plagued by both methodological and conceptual problems.

. . . rapid transitions from virtually all-Spanish language instruction to all-English language instruction is frequently disastrous for students.

In addition to these large-scale studies, a series of smaller studies evaluating the effectiveness of various models of bilingual education have been conducted. These have been synthesized in a series of research reviews and meta-analyses (Baker & de Kanter, 1981; Rossell & Baker, 1996; Willig, 1985), which have reached different conclusions. The earlier studies (Baker & de Kanter, 1981; Danoff, 1978) asked the relatively crude question, “Does bilingual education work?” Subsequent studies (Gersten & Woodward, 1995; Ramírez et al., 1991) have focused more on determining which model of bilingual education works best.

Large-Scale Evaluations

A National Research Council panel of the Committee on National Statistics (Meyer & Fienburg, 1992) reviewed the major evaluation studies in bilingual education for technical accuracy. They concentrated on the then recently completed study by Ramírez (1992) and an earlier large-scale evaluation study conducted by Development Associates (Danoff, 1978). Their conclusions were that the goals of the studies were poorly articulated, the research designs were ill-suited to answering the questions raised, and the researchers’ attempts to remediate the design flaws by use of intricate statistical models proved unsuccessful. An analysis of the Ramírez study provides a useful example of methodological difficulties of large-scale evaluations.

One could argue that the opportunity to express complex ideas verbally in a second language is critical for successful acquisition of the language.

The Ramírez study was extraordinarily ambitious, perhaps overly so in hindsight. Ramírez attempted to determine the relative effectiveness of three types of programs: structured immersion (where virtually all instruction was in English from the beginning of first grade), early exit bilingual education (approximately one year of native-language instruction), and late exit bilingual education (more than one year of native-language instruction).

A serious methodological limitation of the Ramírez study (Rossell, 1992) is that the models of bilingual education were “confounded” with community. In other words, rather than comparing two models of bilingual education in the same city, an approach used in one city was compared to a different approach used in a different city. In fact, five of the nine sites had only one type of program. Consequently, it is possible that effects were due to factors other than the instructional model (e.g., district choice of curriculum, type of professional development in the district). For these reasons, the National Research Council (Meyer & Fienburg, 1992) concluded no valid inferences could be drawn.

A similar, yet more problematic, flaw in the Ramírez (1992) study was that students in the different models were not tested at the same grade levels. So, for example, it was not possible to contrast how students in different models did at the fourth or fifth grade. It is easy to criticize studies after the fact, and it is true that Ramírez, like many other bilingual education researchers, faced problems that do not confront other researchers. In particular, when language of instruction varies, it is awkward and virtually impossible to assess all students on the same measures. However, his failure to “follow up” on the achievement levels attained by students so that reasonable comparisons could be made led to insoluble problems.

Despite the flaws, the Ramírez (1992) study contributed to the knowledge base on effective instruction for English-language learners in two important ways. First, his results strongly suggested that rapid transitions from virtually all-Spanish language instruction to all-English language instruction is frequently disastrous for students. In the past, these drastic transitions have been a frequent practice with English-language learners. Recently, we have noted the tendency toward more gradual transitions, often accompanied by earlier introduction of some English-language content instruction.

The second contribution by Ramírez stemmed from his observations in classrooms where he noted the paucity of extended discourse and questions requiring higher-order thinking in both native-language and English classrooms. Thus, his observational findings do not support the hypothesis that increased use of native language leads to more sophisticated academic discourse. His observations also indicate a major limitation of current practice: that students rarely have the opportunity to express complex ideas in either their native language or English during class. One could argue that the opportunity to express complex ideas verbally in a second language is critical for successful acquisition of the language. This finding has helped fuel an array of innovative instructional approaches that attempt to alter the nature of classroom discourse during instruction.

The recent report by the National Academy of Sciences (August & Hakuta, 1997) concluded that “for numerous reasons, we see little value in conducting evaluations to determine which type of program is best” (p. 138). The members of the National Academy of Sciences panel concluded that potentially more could be learned from smaller evaluation studies than large-scale evaluation studies because of a greater degree of control.
The El Paso Small-Scale Evaluation

We recently completed our own small-scale evaluation of bilingual education in El Paso, Texas (Gersten, Baker, & Keating, 1998; Gersten, Woodward, & Schneider, 1992). The results of this evaluation have been cited frequently in the literature. The El Paso study began in the late 1980s, when we became familiar with that city’s innovative bilingual education program. At that time, it was called bilingual immersion because, unlike other immersion programs in the United States and Canada, students in grades 1 and 2 received approximately 90 minutes of native-language instruction in Spanish that focused primarily on reading and language arts. However, the program was an immersion program because, beginning on the first day of first grade, instruction was predominantly in English, using specially designed instructional techniques such as “sheltered English” or content-area ESL. This model was compared to the district’s transitional bilingual education program, in which the majority of academic instruction in the first few years of school was in the students’ native language.

The evaluation, conducted jointly with the school district, was longitudinal in nature. It examined achievement patterns up until the seventh grade, long after students had exited the specialized programs. The sample sizes were large, over 100 students per condition, allowing for reasonably valid inferences to be made. Only students who were tested and found to be limited-English proficient participated in the study, making this the first evaluation that compared divergent programs within the same district. This feature allowed for much better control of factors, such as curriculum, teacher training and qualifications, and cost per student, that have an influence on learning. We found no difference in academic achievement on standardized tests in either reading, mathematics, or vocabulary at the seventh grade. It is important to reiterate that this was a study of the long-term effects of programs for English-language learners. Studies of short-term effects, though more commonly conducted, are of much less scientific value than knowing the long-term impact of programs on children.

Since we found no achievement differences in the seventh grade, we concluded that early exposure to intensive English-language instruction did not hinder subsequent achievement in any academic area for the group of 109 students who spent the first four years of school in an immersion program. This lack of significant differences—in essence, a “hung jury”—is similar to the findings of Ramírez (1992) in his much larger (though significantly less well-controlled) study of contrasting models of bilingual education.

The El Paso study seems to indicate quite clearly that beginning intensive academic instruction in English in first grade does not hinder, in any way, subsequent academic performance in middle school or high school.

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In the El Paso study, we did detect some benefits of the more rapid introduction of English-language academic instruction. Students in the immersion program entered mainstream classrooms much sooner than students in transitional bilingual education. By sixth grade, over 99 percent of the immersion students were in regular classrooms, compared to only 66 percent of the transitional bilingual education students.

Another important finding was that teacher surveys indicated that teachers felt the much more rapid introduction of English was beneficial to their students. For example, 73 percent of the immersion teachers felt their students would succeed in regular classrooms after the specialized program had ended. Only 45 percent of the transitional bilingual teachers felt that their students would succeed in these settings after the program had ended.

We have continued to follow these students’ progress in school. Recently, we analyzed the scores of the same set of students in high school, examining how well they performed on the Texas Academic Achievement Scale (TAAS), Texas’ statewide examination, which is required for high school graduation. As in the first evaluation, there were no differences between the two samples on state measures of reading, math, or writing. The El Paso study seems to indicate quite clearly that beginning intensive academic instruction in English in first grade does not hinder, in any way, subsequent academic performance in middle school or high school.

Improving the Quality of English-Language Development

Determining the optimal age to begin academic instruction in English may not be answerable. At some point, however, all English-language learners receive academic instruction in English. The initial transition classrooms go by a variety of names, including content-area ESOL, structured immersion, and sheltered content instruction. The common feature of these classrooms is the way teachers’ English is designed specifically for students with limited proficiency. No commonly agreed-upon definition yet encompasses this complex concept, but Echevarria and Graves (1998) and Walqui (1998) provide an excellent beginning. Echevarria and Graves describe sheltered instruction as a method that “provides refuge from the linguistic demands of typical mainstream curriculum” (p. 54). In sheltered classes, “teachers do not simplify—they amplify, they reiterate, reinstate, exemplify in diverse ways … They construct support mechanisms (the reiterations, examples, diagrams) that . . . enable learners to access sophisticated concepts and relationships” (Walqui, p. 8).

With sheltered instruction, use of English is modulated so that it is comprehensible to the student, and the degree of support is determined by the teacher’s knowledge of individual students. In some cases, a student’s native language may be used to help the student complete a task, clarify a point, or respond to a question. Almost invariably, a critical component of sheltered teaching approaches is that content instruction is coupled with instruction geared toward building students’ knowledge of the English language. In years past, this English-language component has been referred to as English-as-a-Second-Language (ESL) or English for Speakers of Other Languages (ESOL). Increasingly, the term English-language development (ELD) is being used.

Historically, the teaching of ESL has focused extensively on the formal structures of language (e.g., grammar, mechanics). This approach is now routinely criticized because it fails to capitalize on the central communicative function.
of language, it does not generate student interest, and it results in very limited generalization (Gammans, 1980; Tharp & Gallimore, 1988).

The 1980s saw the beginning of more “natural” conversational approaches to teaching English. These approaches have also been criticized extensively, on at least two grounds. First, they do not necessarily help students develop competence in the highly abstract, often decontextualized language of academic discourse, which is a central purpose of schooling. In other words, “natural” conversations may have helped with the development of conversational English (which many students seemed to be acquiring through everyday life in the United States anyway), but it rarely helped where help was needed most—with abstract, academic English, critical to understanding science, mathematics, and history.

Another serious shortcoming of the natural-language approach to English-language development was the fact that classrooms are ill-suited for natural conversations between teachers and students. A setting in which one teacher is responsible for organizing and directing activities for 35 children is not one conducive to promoting frequent opportunities for natural conversations. Classrooms are ideally suited for academic conversations. August and Hakuta (1997) note how all contemporary theories “share the important claim that academic language is different from language use in other contexts” (pp. 36–37). Despite widespread understanding of the distinction between these two types of language uses, it is still common for teachers to make the erroneous assumption that possessing command of conversational English means a child can follow abstract discussions of concepts such as antipathy, or gravity, or the causes of World War II.

It was in response to these problems with traditional ESL instruction (focusing on grammar and syntax) and natural conversational approaches to language development that sheltered instruction emerged. The movement began about 10 years ago with the goal of merging English-language learning with content acquisition. Despite some success with this approach, a growing concern seems to be that too often teachers merely “hope that language occurs [during lessons]. There is a risk during content instruction that language development will be neglected” (Gersten & Baker, in press).

Merging English-language Development with Content-Area Learning

The rationale for sheltered approaches is that students can learn English while learning academic content, and that this type of learning will build academic language (Gammans, 1994). However, in numerous professional work group meetings held with practitioners who are experts in teaching English-language learners (Gersten & Baker, in press), the consistent refrain has been:

- Content-area instruction often leads to sacrifices in learning English.
- Few districts have a curriculum program or approach that promotes students’ proper use of the English language.

In discussing concerns about instruction for English-language learners, professional work group members frequently noted how Content-Area ESOL almost invariably fails, in the words of one group member, “to provide adequate time for English-language learning” (Gersten & Baker, in press). In other words, participants felt that teachers often emphasize content acquisition over building English-language abilities. As one teacher noted, “It’s important to use content as a basis for language development … [however] there is a risk during content instruction of neglecting language development” (California professional work group, October 1996, Gersten & Baker, in press).

This concern has been supported by observational research. Most astounding is the low level of student oral language use in English-language development classes noted by Arreaga-Mayer and Perdomo-Rivera (1996). They observed that students used written or oral language only 21 percent of the time. In other words, students rarely spoke during classes in which the explicit purpose was English-language development.

Similarly, Ramírez (1992) concluded that “consistently, across grade levels within and between the three instructional programs, students are limited in their opportunities to produce language and in their opportunities to produce more complex language” (p. 9). This pattern also supports a major finding in our study of issues confronting teachers in the upper elementary grades (Gersten, 1996a; Gersten, 1996b), and also found in observational research by Reyes (1992). We see inadequate time for English-language development as a major problem with current practice.

Several reasons for this problem were identified in the professional work groups we conducted. First and foremost was teachers’ concern for increased accountability for content learning (as measured by test results), as opposed to the more amorphous goals of English-language acquisition, and a relative de-emphasis in accountability for students’ language development needs. Participants in the professional work groups discussed in detail how, based on their observations and experiences in classrooms, the tendency to cover all the content in science, social studies, or mathematics almost invariably precluded allowing adequate time for English-language development, especially more formal academic English.

Other comments in the professional work groups focused on the failure to systematically impart to students skills in speaking and writing standard English, even as late as middle school. While many members felt that the policy of never correcting students for grammatical or pronunciation problems during English-language instruction made sense during the
We believe cooperative learning and peer tutoring strategies have the potential to effectively and rapidly increase English-language development, particularly decontextualized language concepts with high degrees of cognitive challenge.

A recent research study by Fashola, Drum, Mayer, and Kang (1996) may provide some direction in this area. Fashola and colleagues noted how errors made by Latino students in English are usually predictable, and how these predictable errors could become the basis of proactive curricula: “Rather than simply marking a predicted error as incorrect, the teacher could explicitly point out that the phonological or orthographic rule in English is different from the one in Spanish” (Fashola et al., p. 840). After reviewing these issues with professional work groups, and reading about problems with Content-Area ESL in sources as diverse as the New York Times and the Harvard Educational Review (Reyes, 1992), we concluded that an effective English-language development program should include a component devoted to helping students learn how to use the second language according to established conventions of grammar and syntax.

We encourage researchers and educators to consider language learning and content-area learning as distinct educational goals, rather than assuming that increased use of oral language in school will automatically lead to an increase in academic learning and the development of higher-order thinking skills. Artful and skillful blending of genuine dialogue about literature or science with cognitive challenge, is an admirable, but perhaps only occasionally realized, goal. On the other hand, providing some time each day when English-language learners have opportunities to work on all aspects of English-language development, and providing academically challenging content instruction (be it in native language or English), are likely to be more easily achievable, especially if teachers take time to make goals clear and precise.

In short, instruction for English-language learners should work to blend oral language engagement with cognitive engagement.

At about the same time as we conducted the professional work groups with expert practitioners, we conducted a quantitative synthesis of the intervention research on the effectiveness of specific instructional approaches for English-language learners (Gersten & Baker, in press). Through the work groups and quantitative synthesis, we developed some guiding instructional principles for English-language learners that we believe accurately reflect the emerging empirical knowledge base on effective teaching approaches for this population of students.

We briefly describe each of these components in this section.

### Critical Components of Instruction

We identified five specific instructional variables that, although supported by limited experimental evidence, suggest critical components for instruction:

1. **Vocabulary as a curricular anchor.**
   - Vocabulary learning should provide to students and be sensitive to the problems inherent in correcting every grammar mistake students make; however, during later stages, one member reflected the feeling in the group by noting the “importance of identifying errors and providing specific feedback.”
   - Vocabulary learning should play a major role in successful programs for English-language learners. The number of new vocabulary terms introduced at any one time should be limited. For example, the standard method of presenting up to 20 or more new vocabulary words that students are expected to learn at a given time is not an effective way to help English-language learners develop vocabulary. A better technique is to present lists of seven or fewer words that students would work on over relatively long periods of time. Criteria for selecting words should be considered carefully, so that words are selected that convey key concepts, are of high utility, are relevant to the bulk of the content being learned, and have meaning in the lives of students.

2. **Visuals to reinforce concepts and vocabulary.**
   - Restricting the number of words students are expected to learn will help them learn word meanings at a deep level of understanding, an important principle of sustained vocabulary growth. The research of Nagy (1988) and Beck

3. **Cooperative learning and peer tutoring strategies.**
   - At about the same time as we conducted the professional work groups with expert practitioners, we conducted a quantitative synthesis of the intervention research on the effectiveness of specific instructional approaches for English-language learners (Gersten & Baker, in press). Through the work groups and quantitative synthesis, we developed some guiding instructional principles for English-language learners that we believe accurately reflect the emerging empirical knowledge base on effective teaching approaches for this population of students.

4. **Strategic use of the native language.**
   - We identified five specific instructional variables that, although supported by limited experimental evidence, suggest critical components for instruction:

5. **Modulation of cognitive and language demands.**
   - In short, instruction for English-language learners should work to blend oral language engagement with cognitive engagement.

### Principles of Best Practice

We briefly describe each of these components in this section.
Use of visuals to reinforce concepts and vocabulary. The double demands of learning content and a second language are significant, and the difficulty should not be underestimated. Because the spoken word is fleeting, visual aids such as graphic organizers, concept and story maps, and word banks give students a concrete system to process, reflect on, and integrate information.

The effective use of visuals during instruction with English-language learners has ranged from complex semantic visuals (Reyes & Bos, 1998), to visuals based on text structures, such as story maps and compare-contrast “think sheets.” Visuals are especially successful in supporting English-language development because they are an excellent way to help students visualize the abstractions of language.

Intervention studies and several observational studies have noted that the effective use of visuals during instruction can lead to increased learning. Rousseau et al. (1993) used visuals for teaching vocabulary (i.e., words written on the board and pictures), and Saunders et al. (1998) incorporated the systematic use of visuals for teaching, reading, and language arts. Visuals also play a large role in Cognitive Academic Language Learning Approach (CALLA), shown to be related to growth in language development.

Implementation of even simple techniques such as writing key words on the board or using a flip chart while discussing them verbally can support meaningful English-language development and comprehension. However, even the simple integration of visuals is drastically underutilized, and it seems that, even when used, methods are typically inconsistent or superficial and do not support students’ deep processing and thinking.

Use of cooperative learning and peer tutoring strategies. We believe cooperative learning and peer tutoring strategies have the potential to effectively and rapidly increase English-language development, particularly decontextualized language concepts with high degrees of cognitive challenge. Among the expert teachers we talked to, the need for highly structured cooperative learning groups was often stressed.

Intervention studies have used cooperative learning or peer tutoring strategies as critical pieces of their interventions. Klingner and Vaughn (1996) tested whether cooperative learning or peer tutoring was more effective in promoting comprehension with English-language learners with learning disabilities. Although there was some evidence that peer tutoring was the most effective, both interventions led to improved learning outcomes. In the intervention used by Muñiz-Swedgeood (1994), students worked in successively smaller cooperative groups to learn how to generate and answer questions about what they were reading. Students in this intervention did better on measures of reading comprehension than students who were taught using basal reading approaches.

Strategic use of the native language. Strategic use of students’ native language can help ensure that the development of higher-order thinking skills receives adequate curriculum focus. A viable way to achieve this objective is for teachers to use levels of English that students are very fluent with, while simultaneously using students’ native language to introduce complex concepts.

The strategic use of native language is a controversial issue. Many researchers have argued against frequently using dual translations, that is, the extensive use of both the student’s native language and a second language during instruction. Authors of relevant observational studies (Gersten & Jiménez, 1994; Lopez-Reyna, 1996; Minicucci et al., 1995; Tikunoff et al., 1991) have proposed using a student’s native language as an instructional approach. Yet, the findings of Ramirez (1992) indicate that neither more nor less higher-order discussion occurred when instruction was in the native language. Thus, our conclusion is that it is beneficial to use students’ native language, but it should be done in a strategic fashion.

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In a study by Saunders, O’Brien, Lennon, and McLean (1998), critical vocabulary words were identified prior to story reading. A range of approaches was used to help students develop a deep understanding of these words. Students were also guided to link critical vocabulary to relevant experiences in their lives.

In both studies, the time-tested practice of introducing new vocabulary prior to reading a new story was used successfully. Echevarria (1998) described how this type of vocabulary instruction can be used with English-language learners:

“One form of vocabulary development includes short, explicit segments of a class time in which the teacher directly teaches key vocabulary. These five-minute segments would consist of the teacher saying the vocabulary word, writing it on the board, asking students to say it and write it, and defining the term with pictures, demonstrations, and examples familiar to students” (p. 220).
Modulation of cognitive and language demands. This last instructional strategy carries a different weight of importance, and we view it as the most speculative among those we have proposed. The proposition is that during English language-content instruction, effective teachers intentionally vary cognitive and language demands to achieve specific goals. In short, when cognitive demands are high, language expectations are simplified. In this case, for example, teachers may accept brief or truncated responses in English. In another part of the lesson, cognitive demands are intentionally reduced so that students can more comfortably experiment with extended English-language use.

This proposition was supported in each of the five professional work groups conducted. It also appears consonant with contemporary theories of second-language acquisition (e.g., August & Hakuta, 1997). Empirical support for this proposition is needed, although designing a suitable research study around such a subtle principle will be difficult.

Conclusion

The climate for how best to meet the instructional needs of English-language learners is changing in many parts of the country. In California, it is now law that English-language learners can receive no more than one year of native-language instruction, unless special provisions are made. The U.S. Department of Education has argued that a critical academic goal for English-language learners needs to be their more rapid attainment of proficiency in English.

For many years, research in bilingual education has tried to determine the optimum time to begin English-language instruction for English-language learners. The dominant theory in bilingual education has been that proficiency in a student’s native language is needed before full-time instruction in English can be provided. There is virtually no research to support this position, however, as reported by the National Academy of Sciences (August & Hakuta, 1997). The report’s condemnation of large-scale evaluation studies, typical of research conducted in bilingual education, has precluded research in other areas that may have better advanced the knowledge on effective instruction for English-language learners. The report recommends an increase in smaller, more tightly controlled studies. The El Paso study, showing that there were no differences between a transitional bilingual education program and an immersion program, is one example of this type of study.

Increasingly, researchers argue that we need to think of components of instruction that lead to improved learning outcomes as opposed to broad instructional labels that, at best, crudely describe complex instructional interventions. August and Hakuta (1997) provide several excellent “lessons learned” from the past 20 years of program evaluation research. In our view, the most relevant is the following:

Programs that are seemingly very different—especially the most successful ones—may have very similar characteristics. These characteristics include the following:

- some native-language instruction
- for most students, a relatively early phasing in of English instruction
- teachers specially trained in instructing English-language learners.

… Historically, programs are described as unitary; a student is either in a program or not. The current debate on the relative efficacy of immersion and bilingual education has been cast in this light …

We need to move away from thinking about programs in such broad terms and instead see them as containing multiple components—features that are available to meet the differing needs of particular students … (p. 156).

In our view, there is far from firm support for the first of the three bullets, but, as a set, they appear to be reasonable guidelines. We especially value the sense of looking at components rather than full programs.

The erratic quality of instruction aimed at English-language development is at the root of the growing dissatisfaction with current practice. Inadequate attention has been devoted to curriculum development, pragmatic teacher training and professional development, and applied research. An emerging body of research suggests that the use of approaches such as “sheltered English,” whereby the linguistic demands placed on students are aligned with their knowledge of English, can lead to students’ learning of complex, age-appropriate content, as well as English-language development. We have proposed that particularly effective teachers carefully modulate their use of English depending on their teaching goals. They decrease cognitive demands when English-language development is the primary goal, and increase cognitive demands when content acquisition is the goal. Of immediate concern in the widespread use of effective sheltered instructional approaches is that inadequate time and energy is devoted to the English language-development component.
We believe some progress has been made in developing an empirical knowledge base on specific and well-defined instructional approaches that are effective for English-language learners. Through our work with expert practitioners, as well as our synthesis of relevant intervention research, we have begun to develop a set of instructional principles that we believe provide a solid beginning. These principles address anchoring curriculum goals to vocabulary development, using visuals to reinforce learning and retention, using small-group instructional strategies such as cooperative groups and peer tutoring, and the strategic use of the students’ native language to reinforce content learning.

**About the Authors**


**SCOTT BAKER** is a research associate with Eugene Research Institute. He is currently Principal Investigator (PI) of three research projects funded by the U.S. Department of Education. Baker's research has been published in professional journals such as *School Psychology Review, Exceptional Children, Learning Disabilities Research and Practice, Learning Disabilities Quarterly*, and the *Journal of Learning Disabilities*. Baker has considerable experience working on assessment and instruction issues involving English-language learners. He co-authored a recent book published by the Council for Exceptional Children on effective instructional practices for English-language learners with disabilities. Baker also conducted one of the only empirical studies investigating the use of Curriculum-Based Measurement for English-language learners. Currently, he is conducting a study funded by the state of California on effective instructional approaches in the early primary grades for English-language learners in high-poverty schools.
The key to long-term success in school is to become proficient in academic English. This variety of English represents the advanced forms of English needed to enter and complete higher education as well as to advance in the labor market. When the California high school exit exam is required for graduation in 2004, all public high school students will need to be proficient in academic English.

Currently, few students in California are proficient in academic English. Even the most successful high school graduates in California—the top 12 percent who enter the University of California—often have not mastered academic English: one-third fail to meet the freshman writing requirement and must take remedial classes. And half of all California State University freshmen—those from the upper third of California’s high school graduates—require remediation in academic English.

What is academic English?

Academic English is very different from the English used in everyday, ordinary situations. Although both require a series of linguistic competencies in the four language skill areas—reading, writing, speaking, and listening—there are several important differences. First, although both academic English and everyday English entail reading, writing, speaking and listening, academic English makes more extensive use of reading and writing, and ordinary English makes more extensive use of listening and speaking.

Second, some competencies play a more important role in academic English than they do in everyday English. For example, the accurate use of grammar and vocabulary are more critical in academic writing than in everyday conversations.

Third, in academic English, specific linguistic functions—such as persuading, arguing and hypothesizing—are more important than other functions—such as narratives. This is the exact opposite in everyday English.

Fourth, in contrast to ordinary English, academic English is cognitively demanding and must be learned without contextual clues—students must rely on their prior knowledge of words, grammar and pragmatic conventions to understand and interpret it.

Finally, and perhaps most importantly, academic English requires a much greater mastery of an extensive range of linguistic features than ordinary English. The key words here are mastery and extensive. While words and phrases may be used inaccurately in ordinary conversation, academic English requires their mastery. Academic English also requires a more extensive knowledge of English. For instance, to be competent in academic English, one must know over 20,000 word forms as well as the grammatical restrictions governing their use.

But academic English involves more than language skills; it also requires several other skills. One is metalinguistic awareness, or the ability to think about language. This awareness enables writers to choose correct word forms (agitated or agitating) and reflect on subject-verb agreement, pronoun reference, and verb sequencing. Another is background knowledge that enables one to comprehend what is being read. Finally, academic English entails higher-order thinking skills and abilities that enable students to evaluate and synthesize material from a number of sources, to determine the credibility of sources, and to distinguish fact from skewed opinion.

How is academic English acquired?

Children do not pick up academic English subconsciously by talking to their friends, whether or not their friends are speakers of Standard English. This is because academic English is not used in casual conversations. This makes the task of acquiring academic English daunting for many children, even native English-speaking children who come from highly literate households.

Good reading instruction is essential for the development of academic English. However, even this is not enough. Instruction that is focused on language itself is crucial to learning academic English well. The instruction must have several characteristics: (1) it must provide students with abundant exposure to academic English and get students to use this English accurately in their speech and writing; (2) it must focus the students’ attention on the features of academic English; (3) it must provide students with appropriate feedback concerning their use of academic English; and (4) it must provide explicit instruction of specific aspects of academic English including vocabulary, morphology, syntax, and cognitive strategies.

Unfortunately, instruction in academic English is often missing from California classrooms. Current statewide standards and assessments do not adequately address all the competencies associated with academic English. Hence, classroom instruction often targets only some aspects, especially those that are currently assessed in the state’s Standardized Testing and Reporting (STAR) program. This shortcoming is less problematic for more informed
and resourceful middle class families and schools that can push for local policies and practices to provide the necessary instruction. Some schools, for example, have instituted their own writing programs that teach all forms of academic writing.

English learners who enter California classrooms without a strong foundation in reading and academic language in their home countries may need even more intensive instruction in academic English than those with this foundation. However, even those who do have this foundation may still have difficulty acquiring academic English and require intensive instruction. Individual factors play a role: for example, whether students are motivated to learn academic English, whether they have the time to study it, whether it is easy or desirable for them to interact with proficient English speakers, whether the proficient English speakers deign to interact with the English learners, whether the English learners are motivated to read.

Yet, at present, we lack a sufficient research base to fully understand how English learners develop academic English. The federal government has initiated a major research program to develop such a knowledge base. With the largest population of English learners in the United States, California should participate in this effort.

—ROBIN SCARCELLA AND RUSSELL W. RUMBERGER

NOTE: This article was based on a discussion paper, “Academic English: A Conceptual Framework,” that will be published by UC LMRI in the fall.
Isn’t English a Trip?

By Jose Franco

Isn’t English a trip?
Every day while I sit in class and wait for Mrs. Jones to call on me, she writes on the chalkboard and yet—
I look at a greenboard.

And when reading time rolls around, It’s hard to understand why the word Nike is not pronounced like bike, or hike, or Mike.

Mrs. Jones always gives us these rules, I remember the one about “when two vowels go walking, the first one does the talking and the second does the walking.”

And guess what!

It works with a word like beans. There are two vowels—e does the talking and a does the walking.

Sort of like my sister and me—She does all the talking and I do all the walking.

BUT

Then they break the rules.

What about words like choose or eight or feather?

There are two vowels walking. So which one is the talker and which one is the walker?

I thought it would be easier when math class started. Because that’s just about numbers, and circles, and things like that, right?

Was I in for a surprise?

When Mrs. Jones started talking about addition, She used the word plus Like 2 plus 2 equals 4. Sounds good to me. But last week she mentioned the word combine, And she said that means addition, too.

All right…

On Monday we were doing some math problems.

(Oh man! I had a hard time reading—TOO MANY WORDS! I didn’t understand them all, but my buddy Julio helped me out. Now I owe him one, but that’s another story.)

Anyway…
We were doing our math problems. I read the problem and it said the herd of elephants was increased by three. Julio and his cousin Julia told me that increased by means addition also.

“What Mrs. Jones? Could you please repeat your question? What’s the sum of all of the elephants?”

Hmmm... What did Julia tell me sum meant? Is that the same as some, like “when some of the kids tease me?”

“Sorry, Mrs. Jones. I don’t know what the sum is.” (Actually I don’t know what that word means.)

Oh well— I hope tomorrow I have a better day.

Right now I have to catch up with my friend Herb. I just learned in science class today that in the word herb, the h is silent. I need to apologize to Erb for saying his name wrong.

Isn’t English a trip?!
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<tr>
<th>Category</th>
<th>Beginning</th>
<th>Early Intermediate</th>
<th>Intermediate</th>
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<th>Advanced</th>
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<tbody>
<tr>
<td>Nouns &amp; Articles</td>
<td>• Singular and plural common nouns in student’s immediate world.</td>
<td>• Countable and uncountable nouns (one pencil, water)</td>
<td>• Possessive nouns (teacher’s, friend’s)</td>
<td>• Content area abstract nouns (democracy, safety, freedom)</td>
<td>• Figurative language (metaphors, similes)</td>
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<td></td>
<td>• Regular plurals with -s and -es</td>
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<td>• Derivational: verb to noun gerunds (Walking is healthy. Feeding bears is</td>
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<td></td>
<td>• Articles the and a (a book)</td>
<td>• Articles a/an</td>
<td>• Derivational: sad, sadness</td>
<td>not a good idea.)</td>
<td></td>
</tr>
<tr>
<td>Prepositions</td>
<td>• Receptive, limited production (Can, cannot, may, may not)</td>
<td>• Contractions (be, can, do, have, will) I’m, can’t, don’t, haven’t, I’ll</td>
<td>• Demonstrative / object pronouns (this, that, these, those, her, him, us)</td>
<td>• Reflexive pronouns (myself, yourself, himself, ourselves)</td>
<td>• Relative pronouns—used to introduce an adjective clause—(who, whom, whose, which, that)</td>
</tr>
<tr>
<td></td>
<td>• Can, may questions (Can you help me? May I go to the bathroom?)</td>
<td>• Subject pronouns (he, she)</td>
<td>• Possessive pronouns (mine, yours, hers, his, ours, theirs) It’s theirs, That’s his.</td>
<td>• Modals (could, would, should, may, might, must)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Location (next to, beside, between, in front of, in back of, behind, on the left/right, in the middle of, above, below, under)</td>
<td>• Subject pronouns (her, him, me, as, them)</td>
<td>• Contractive / object pronouns (this, that, these, those, her, him, us)</td>
<td>• Specialized prepositions (until, since, for, from...to...)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Direction (up, down, over, under, through, across, around, into)</td>
<td>• Object pronouns (her, his, their, our) our ball, her book</td>
<td>• Should + verb (You should study.)</td>
<td>• Time (during, while, at [certain time], on [certain day of the week], in [certain month, season])</td>
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<tr>
<td></td>
<td>• Time (before, after)</td>
<td>• Possessive pronouns (her, his, their, our) our ball, her book</td>
<td>• Prognostics (could, should, would)</td>
<td>• Verb / word + preposition (look at/look for, different from/different than)</td>
<td></td>
</tr>
<tr>
<td>Conjunctions</td>
<td>• Coordinating conjunction (In phrases, such as pen, and pencil, brother and sister, running and skating)</td>
<td>• Coordinating conjunctions (and, or, but, because in phrases and sentences such as You can use a pen or a pencil.)</td>
<td>• Show time &amp; cause/effect: Coordinating conjunctions (for, so, yet) We are selling candy so we can take a trip.</td>
<td>• Subordinating conjunctions—used to form adverb clauses which show time and cause and effect. relationships - (although, whenever, as soon as)</td>
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</tr>
<tr>
<td></td>
<td>• Location (on, off, in, out, inside, outside)</td>
<td>• Show time &amp; cause/effect: Coordinating conjunctions (and, or, but, because in phrases and sentences such as You can use a pen or a pencil.)</td>
<td>• Subordinating conjunctions (after, because, before, when)</td>
<td>• Correlative conjunctions (both/and; either/or; neither/nor; not only/but also; whether/or)</td>
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</tr>
<tr>
<td></td>
<td>• Coordinating conjunctions (and, or, but, because in phrases and sentences such as You can use a pen or a pencil.)</td>
<td>• Descriptive, big, brown</td>
<td>• Descriptive &amp; superlative adjectives w/special forms (good, better, best; bad, worse, worst; some, more, most, little, least)</td>
<td>• Quantities (any, many, much, few, several)</td>
<td>• Abstract idiomatic expressions</td>
</tr>
<tr>
<td></td>
<td>• Descriptive big, brown</td>
<td>• Possessive adjectives (her, his, our, is, our, your, their)</td>
<td>• Comparative with than and as... as (taller than, as tall as)</td>
<td>• Too + adjective (too red)</td>
<td>• Abstract similes and metaphors from literature</td>
</tr>
<tr>
<td></td>
<td>• Ordinal numbers (first, etc.)</td>
<td>• Comparative (small, bigger)</td>
<td>• Multiple adjectives (dry brown soil)</td>
<td>• Similes</td>
<td>• Adjective clauses introduced by relative pronouns (He was the teacher who taught history.)</td>
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<tr>
<td></td>
<td>• Concrete</td>
<td>• Superlatives (-est, biggest)</td>
<td>• Derivation: noun to adj, care, careful</td>
<td>• Adjectives with -ish or -y (milky, sluggish)</td>
<td>• Adjective clauses introduced by subordinating conjunctions (Clap twice whenever you hear the sound.)</td>
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<tr>
<td></td>
<td>• Comparatives (-er, bigger)</td>
<td>• Antonyms (tall/short, slow/fast, new/old)</td>
<td>• Synonyms and antonyms (nice, likeable, mean, evil)</td>
<td>• Adverbs without -ly (fast, well, very, too, enough)</td>
<td>• Specialized adverbs (already, yet, still, anymore)</td>
</tr>
<tr>
<td></td>
<td>• Adverb clauses introduced by subordinating conjunctions (e.g., that was bad news. We should do it)</td>
<td>• Adverbs without -ly (fast, well, very, too, enough)</td>
<td>• Adverbs modifying verb “We walked slowly”</td>
<td>• Too + adverb (too fast)</td>
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<tr>
<td></td>
<td>• “We walked slowly”</td>
<td>• Adverbs modifying verb “We walked slowly”</td>
<td>• Extend speech for specificity “Yesterday we walked slowly through the park.”</td>
<td>• Well vs. good. (Good job, well done. That was a good book. She writes well.)</td>
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<td></td>
<td>• Formula phrases with ‘very’ (very big, very good, very quiet)</td>
<td>• Modify adjective (I was very late. The problem was too hard.)</td>
<td>• Modify adjective (I was very late. The problem was too hard.)</td>
<td>• Specialized adverbs (already, yet, still, anymore)</td>
<td></td>
</tr>
</tbody>
</table>

CISC/UCOP Mathematics Support Modules  S. Dutro/CRLP/2000 PP - 10
## ELD Matrix: Scope & Sequence of Levels of English Language Proficiency

<table>
<thead>
<tr>
<th>Progression of Student Competencies</th>
<th>General Description of Proficiency</th>
<th>Physically/Nonverbally</th>
<th>Oral Language</th>
<th>Oral &amp; Written Language</th>
<th>Sentense Structure</th>
<th>Describing Actions &amp; States of being VERBS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beginning</strong></td>
<td><strong>Early Intermediate</strong></td>
<td><strong>Intermediate</strong></td>
<td><strong>Early Advanced</strong></td>
<td><strong>Advanced</strong></td>
<td><strong>Beginning</strong></td>
<td><strong>Early Intermediate</strong></td>
</tr>
<tr>
<td>• Minimal comprehension of general meaning</td>
<td>• Increased comprehension of general meaning and some specific meaning</td>
<td>• Good comprehension of general meaning; increased comprehension of specific meaning</td>
<td>• Consistent comprehension of general meaning; good understanding of implied meaning</td>
<td>• Comprehension of general and implied meaning, including idiomatic and figurative language</td>
<td>• Responds to commands (Point to the... Circle the...)</td>
<td>• Exclamations (I love cookies!)</td>
</tr>
<tr>
<td>• Gains familiarity with the sounds, rhythms and patterns of English. Early: no verbal response Later: one-two word responses: “bear, brown”</td>
<td>• Responds in single words and phrases which may include a subject or a predicate</td>
<td>• Some basic errors in speech</td>
<td>• Responds in more complex sentences, with more detail using newly acquired vocabulary to experiment and form messages: “The brown bear lived with his family in the forest.”</td>
<td>• Phrasal verbs (Turn on the light. Turn the light on.)</td>
<td>• Present tense (produce) be, have. He is a boy. I have two sisters.</td>
<td>• Positive/negative form-questions (Is she laughing?)</td>
</tr>
<tr>
<td>• Many basic errors in speech</td>
<td>• Uses routine expressions independently. Responds using phrases and simple sentences, which include a subject &amp; predicate: “The bear is brown. He is eating.”</td>
<td>• Fewer errors in speech</td>
<td>• Sustains conversation, responds w/detail in compound &amp; complex sentences, actively participates using more extensive vocabulary; “Can bears live in the forest if they find food there?”</td>
<td>• Standard grammar with few random errors</td>
<td>• From own experience write using frames or simple vignettes with frames.</td>
<td>• Write using frames or simple vignettes from experience (with content word banks and other supports)</td>
</tr>
</tbody>
</table>
(Key standards shown in bold comprise a minimum of 70% of the CST)

**Kindergarten**
1.0 Students understand the concept of time and units to measure it; they understand that objects have properties, such as length, weight, and capacity, and that comparisons may be made by referring to those properties:
1.1 Compare the length, weight, and capacity of objects by making direct comparisons with reference objects (e.g., note which object is shorter, longer, taller, lighter, heavier, or holds more).
1.2 Demonstrate an understanding of concepts of time (e.g., morning, afternoon, evening, today, yesterday, tomorrow, week, year) and tools that measure time (e.g., clock, calendar).
1.3 Name the days of the week.
1.4 Identify the time (to the nearest hour) of everyday events (e.g., lunch time is 12 o’clock; bedtime is 8 o’clock at night).

2.0 Students identify common objects in their environment and describe the geometric features:
2.1 Identify and describe common geometric objects (e.g., circle, triangle, square, rectangle, cube, sphere, cone).
2.2 Compare familiar plane and solid objects by common attributes (e.g., position, shape, size, roundness, number of corners).

**First Grade**
1.0 Students use direct comparison and nonstandard units to describe the measurements of objects:
1.1 Compare the length, weight, and volume of two or more objects by using direct comparison or a nonstandard unit.
1.2 Tell time to the nearest half hour and relate time to events (e.g., before/after, shorter/longer).

2.0 Students identify common geometric figures, classify them by common attributes, and describe their relative position or their location in space:
2.1 Identify, describe, and compare triangles, rectangles, squares, and circles, including the faces of three-dimensional objects.
2.2 Classify familiar plane and solid objects by common attributes, such as color, position, shape, size, roundness, or number of corners, and explain which attributes are being used for classification.
2.3 Give and follow directions about location.
2.4 Arrange and describe objects in space by proximity, position, and direction (e.g., near, far, below, above, up, down, behind, in front of, next to, left or right of).

**Second Grade (CST Weight: 22%)**
1.0 Students understand that measurement is accomplished by identifying a unit of measure, iterating (repeating) that unit, and comparing it to the item to be measured:
1.1 Measure the length of objects by iterating (repeating) a nonstandard or standard unit.
1.2 Use different units to measure the same object and predict whether the measure will be greater or smaller when a different unit is used.
1.3 Measure the length of an object to the nearest inch and/ or centimeter.
1.4 Tell time to the nearest quarter hour and know relationships of time (e.g., minutes in an hour, days in a month, weeks in a year).
1.5 Determine the duration of intervals of time in hours (e.g., 11:00 a.m. to 4:00 p.m.).

2.0 Students identify and describe the attributes of common figures in the plane and of common objects in space:
2.1 Describe and classify plane and solid geometric shapes (e.g., circle, triangle, square, rectangle, sphere, pyramid, cube, rectangular prism) according to the number and shape of faces, edges, and vertices.
2.2 Put shapes together and take them apart to form other shapes (e.g., two congruent right triangles can be arranged to form a rectangle).

**Third Grade (CST Weight: 25%)**
1.0 Students choose and use appropriate units and measurement tools to quantify the properties of objects:
1.1 Choose the appropriate tools and units (metric and U.S.) and estimate and measure the length, liquid volume, and weight/mass of given objects.
1.2 Estimate or determine the area and volume of solid figures by covering them with squares or by counting the number of cubes that would fill them.
1.3 Find the perimeter of a polygon with integer sides.
1.4 Carry out simple unit conversions within a system of measurement (e.g., centimeters and meters, hours and minutes).
2.0 Students describe and compare the attributes of plane and solid geometric figures and use their understanding to show relationships and solve problems:

2.1 Identify, describe, and classify polygons (including pentagons, hexagons, and octagons).
2.2 Identify attributes of triangles (e.g., two equal sides for the isosceles triangle, three equal sides for the equilateral triangle, right angle for the right triangle).
2.3 Identify attributes of quadrilaterals (e.g., parallel sides for the parallelogram, right angles for the rectangle, equal sides and right angles for the square).
2.4 Identify right angles in geometric figures or in appropriate objects and determine whether other angles are greater or less than a right angle.
2.5 Identify, describe, and classify common three-dimensional geometric objects (e.g., cube, rectangular solid, sphere, prism, pyramid, cone, cylinder).
2.6 Identify common solid objects that are the components needed to make a more complex solid object.

Fourth Grade CST Weight: 18%

1.0 Students understand perimeter and area:
1.1 Measure the area of rectangular shapes by using appropriate units, such as square centimeter (cm²), square meter (m²), square kilometer (km²), square inch (in²), square yard (yd²), or square mile (mi²).
1.2 Recognize that rectangles that have the same area can have different perimeters.
1.3 Understand that rectangles that have the same perimeter can have different areas.
1.4 Understand and use formulas to solve problems involving perimeters and areas of rectangles and squares. Use those formulas to find the areas of more complex figures by dividing the figures into basic shapes.

1.0 Students use two-dimensional coordinate grids to represent points and graph lines and simple figures:
2.1 Draw the points corresponding to linear relationships on graph paper (e.g., draw 10 points on the graph of the equation y = 3x and connect them by using a straight line).
2.2 Understand that the length of a horizontal line segment equals the difference of the x-coordinates.
2.3 Understand that the length of a vertical line segment equals the difference of the y-coordinates.

3.0 Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems:
3.1 Identify lines that are parallel and perpendicular.
3.2 Identify the radius and diameter of a circle.
3.3 Identify congruent figures.
3.4 Identify figures that have bilateral and rotational symmetry.
3.5 Know the definitions of a right angle, an acute angle, and an obtuse angle. Understand that 90°, 180°, 270°, and 360° are associated, respectively, with 1/4, 1/2, 3/4, and full turns.
3.6 Visualize, describe, and make models of geometric solids (e.g., prisms, pyramids) in terms of the number and shape of faces, edges, and vertices; interpret two-dimensional representations of three-dimensional objects; and draw patterns (of faces) for a solid that, when cut and folded, will make a model of the solid.
3.7 Know the definitions of different triangles (e.g., equilateral, isosceles, scalene) and identify their attributes.
3.8 Know the definition of different quadrilaterals (e.g., rhombus, square, rectangle, parallelogram, trapezoid).

Fifth Grade CST Weight: 23%

1.0 Students understand and compute the volumes and areas of simple objects:
1.1 Derive and use the formula for the area of a triangle and of a parallelogram by comparing it with the formula for the area of a rectangle (i.e., two of the same triangles make a parallelogram with twice the area; a parallelogram is compared with a rectangle of the same area by cutting and pasting a right triangle on the parallelogram).
1.2 Construct a cube and rectangular box from two-dimensional patterns and use these patterns to compute the surface area for these objects.
1.3 Understand the concept of volume and use the appropriate units in common measuring systems (i.e., cubic centimeter [cm³], cubic meter [m³], cubic inch [in³], cubic yard [yd³]) to compute the volume of rectangular solids.
1.4 Differentiate between, and use appropriate units of measures for, two-and three-dimensional objects (i.e., find the perimeter, area, volume).

2.0 Students identify, describe, and classify the properties of, and the relationships between, plane and solid geometric figures:
2.1 Measure, identify, and draw angles, perpendicular and parallel lines, rectangles, and triangles by using appropriate tools (e.g., straightedge, ruler, compass, protractor, drawing software).
2.2 Know that the sum of the angles of any triangle is 180° and the sum of the angles of any quadrilateral is 360° and use this information to solve problems.
2.3 Visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids.

Sixth Grade (CST Weight: 15%)

1.0 Students deepen their understanding of the measurement of plane and solid shapes and use this understanding to solve problems:

1.1 Understand the concept of a constant such as π; know the formulas for the circumference and area of a circle.
1.2 Know common estimates of π (3.14; 22/7) and use these values to estimate and calculate the circumference and the area of circles; compare with actual measurements.
1.3 Know and use the formulas for the volume of triangular prisms and cylinders (area of base x height); compare these formulas and explain the similarity between them and the formula for the volume of a rectangular solid.

2.0 Students identify and describe the properties of two-dimensional figures:

2.1 Identify angles as vertical, adjacent, complementary, or supplementary and provide descriptions of these terms.
2.2 Use the properties of complementary and supplementary angles and the sum of the angles of a triangle to solve problems involving an unknown angle.
2.3 Draw quadrilaterals and triangles from given information about them (e.g., a quadrilateral having equal sides but no right angles, a right isosceles triangle).

Seventh Grade (CST Weight: 20%)

1.0 Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:

1.1 Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).
1.2 Construct and read drawings and models made to scale.
1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.

2.0 Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area, and volume are affected by changes of scale:

2.1 Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders.
2.2 Estimate and compute the area of more complex or irregular two-and three-dimensional figures by breaking the figures down into more basic geometric objects.
2.3 Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor.
2.4 Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or [1 ft 2] = [144 in 2], 1 cubic inch is approximately 16.38 cubic centimeters or [1 in 3] = [16.38 cm3]).

3.0 Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures:

3.1 Identify and construct basic elements of geometric figures (e.g., altitudes, mid-points, diagonals, angle bisectors, and perpendicular bisectors; central angles, radii, diameters, and chords of circles) by using a compass and straightedge.
3.2 Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflections.
3.3 Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.
3.4 Demonstrate an understanding of conditions that indicate two geometrical figures are congruent and what congruence means about the relationships between the sides and angles of the two figures.
3.5 Construct two-dimensional patterns for three-dimensional models, such as cylinders, prisms, and cones.
3.6 Identify elements of three-dimensional geometric objects (e.g., diagonals of rectangular solids) and describe how two or more objects are related in space (e.g., skew lines, the possible ways three planes might intersect).
### Development of Mathematical Content Strands Throughout the Grades
**California Mathematical Content Standards**

<table>
<thead>
<tr>
<th>Mathematical Reasoning</th>
<th>K</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Students make decisions about how to set up a problem.</td>
<td>1.0</td>
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<td>Determine the approach, materials, and strategies to be used.</td>
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<td>Use tools and strategies, such as manipulatives or sketches, to model problems.</td>
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<tr>
<td>Use tools, such as manipulatives or sketches, to model problems.</td>
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<tr>
<td>Students solve problems and justify their reasoning.</td>
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<tr>
<td>Students solve problems in reasonable ways and justify their reasoning.</td>
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<td>Explain the reasoning used with concrete objects and/or pictorial representations.</td>
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<td>Make precise calculations and check the validity of the results from/in the context of</td>
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<td>2.2</td>
<td>2.2</td>
<td>2.6</td>
<td>2.6</td>
<td>2.6</td>
<td>2.7</td>
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<tr>
<td>Students make decisions about how to approach problems.</td>
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<td>Analyze problems by identifying relationships, distinguishing relevant from irrelevant</td>
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<td>1.1</td>
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<td>information, sequencing and prioritizing information, and observing patterns.</td>
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<td>Explain the reasoning used and justify the procedures selected.</td>
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<td>Defend the reasoning used and justify the procedures selected.</td>
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<td>2.1</td>
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<tr>
<td>information, identifying missing information, sequencing and prioritizing information,</td>
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<td>and observing patterns.</td>
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<td>Formulate and justify mathematical conjectures based on a general description of the</td>
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<td>1.2</td>
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<td>mathematical question or problem posed.</td>
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<tr>
<td>Determine when and how to break a problem into simpler parts.</td>
<td>1.2</td>
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<td>1.3</td>
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<tr>
<td>Students use strategies, skills, and concepts in finding solutions.</td>
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<td>Use estimation to verify the reasonableness of calculated results.</td>
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<tr>
<td>Apply strategies and results from simpler problems to more complex problems.</td>
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<td>Estimate unknown quantities graphically and solve for them by using logical reasoning</td>
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<td>and arithmetic and algebraic techniques.</td>
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<tr>
<td>Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables,</td>
<td>2.3</td>
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<tr>
<td>diagrams, and models, to explain mathematical reasoning.</td>
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<tr>
<td>Express the solution clearly and logically by using the appropriate mathematical</td>
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<tr>
<td>notation and terms, and clear language; support solutions with evidence in both verbal</td>
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<td>and symbolic work.</td>
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<tr>
<td>Indicate the relative advantages of exact and approximate solutions to problems and</td>
<td>2.5</td>
<td>2.5</td>
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<tr>
<td>give answers to a specified degree of accuracy.</td>
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<tr>
<td>Students move beyond a particular problem by generalizing to other situations.</td>
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<tr>
<td>Evaluate the reasonableness of the solution in the context of the original situation.</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
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<tr>
<td>Note the method of deriving the solution and demonstrate a conceptual understanding of</td>
<td>3.2</td>
<td>3.2</td>
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<tr>
<td>the derivation by solving similar problems.</td>
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<tr>
<td>Develop generalizations of the results obtained and apply them in other circumstances.</td>
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<td>3.3</td>
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<tr>
<td>Students note connections between one problem and another.</td>
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<tr>
<td>Develop generalizations of the results obtained and the strategies used and apply them</td>
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<td>in new problem situations.</td>
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</tbody>
</table>

**CISC/UCOP Mathematics Support Modules**
Five Step Process for Teaching Vocabulary
(Robert Marzano)

1. Present students with a brief explanation or description of the new term or phrase.
   - Defining words
   - Words are repeated in various contexts
   - Describing words
   - Extending words with anecdotes
   - Make associations
   - Charting characteristics
   - Rephrasing
   - Analyzing structure
   - Providing tactile examples

2. Present students with a nonlinguistic representation of the new term or phrase.
   - Using visuals
   - Using gestures
   - Comparing and contrasting

3. Ask students to generate their own explanations or descriptions of the term or phrase.
   - Words are made relevant to students’ lives by linking them to their experience
   - Students write about them

4. Ask students to create their own nonlinguistic representation of the term or phrase.
   - Using visuals
   - Using gestures

5. Comparing and contrasting
   - Periodically ask students to review the accuracy of their explanations and representations
   - Questioning
   - Giving examples of correct and incorrect usage
<table>
<thead>
<tr>
<th>New Word</th>
<th>My Definition</th>
<th>Example</th>
<th>Non-Example</th>
<th>How I would use it. (sentence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polygon</td>
<td>A polygon is a closed figure whose sides are all line segments.</td>
<td>![Hexagon]</td>
<td>![Non-Example Polygon]</td>
<td>A rectangle is a polygon with opposite sides parallel and four right angles. A quadrilateral is a polygon with four sides.</td>
</tr>
</tbody>
</table>
Frayer Model

Characteristics                     Non-Characteristics             Characteristics                    Non-Characteristics
• closed figure
• sides are line segments

Examples                                         Non-Examples         Examples                                          Non-Examples
triangle
rectangle
square
rhombus

Polygon

Examples                                         Non-Examples        Examples                                          Non-Examples
all sides closed
line segment

Characteristics                     Non-Characteristics
• open figure
• sides are not segments

Examples                                         Non-Examples
### Lesson Planning Guide

**Lesson Study Practitioners:**

**Lesson:**

**Research Theme:**

**Content Goal:**

**Language Goal:**

**CA Math Standards** | **Grade** | **Strand** | **No.** | **Standard Description**
--- | --- | --- | --- | ---

**Attending to English Learners’ needs through differentiated instruction:** Total Physical Response; building on prior knowledge; using realia/tools/manipulatives; working with partners; acting things out; comprehension checks; accepting responses at student level; allowing enough wait time; moving thoughtfully from concrete to abstract; planning meaningful practice.

<table>
<thead>
<tr>
<th>Teacher Perspective</th>
<th>Student Perspective</th>
<th>Academic Language Support</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections with previous lesson(s):</td>
<td>Anticipate student responses:</td>
<td>Prior Knowledge: Vocabulary:</td>
<td></td>
</tr>
<tr>
<td>List what students have learned previously that will help them with this lesson (math, language, experiences). What connections with prior mathematics and language do you want them to make?</td>
<td>What the students will be doing? e.g., If prior knowledge is introduced through KWL chart, students will be telling teacher what they know and what they want to learn.</td>
<td>List the vocabulary that students have previously learned and that they will need to use in this lesson.</td>
<td></td>
</tr>
</tbody>
</table>

**Purpose & expectations of lesson clarified:**

The wording used to tell students the goal of the lesson. In Japan they may tell the students that they are to think hard about geometry.

**Introduction to problem/task:**

The problem is introduced so that all students can enter into the work. Language is modeled.

**Verify that students understand problem:**

As students work on the problem individually, the teacher is verifying that they understand what is being asked of them.

**Prompts to help students access problem:**

List prompts and teaching strategies that can be used to help students access the problem. List possible ways that students will access the problem and places where learning struggles may happen.

**Prompts to help students make leaps:**

List prompts and support that will help students make leaps.

**Look for work that demonstrates:**

As students are working, note different strategies and solution paths they are using. Which of these would the class benefit from hearing? If want presentations on the board/overhead/chart, ask students to prepare.

**Teacher guided reporting:**

**Summary points making mathematics explicit:**

List the mathematical points, connections, relationships to be made and the academic language to be made explicit.

**Reflection:**

What are the ideas, connections, understanding that you would like students to consider? What prompt would focus the reflection?

**Homework:**

**Anticipate student responses:**

What the students will be doing? e.g., If prior knowledge is introduced through KWL chart, students will be telling teacher what they know and what they want to learn.

**Target Vocabulary:**

Three–seven target words for direct teaching during the lesson.

**Sentence Frames:**

The sentence frames—from beginning to advanced proficiency levels.

**Visuals for Support**

What vocabulary/language support will be available e.g. charts, dictionaries, word walls.

**Guided Reporting**

**Selected work presented to class (concrete to abstract):** Students present work.
Lesson Planning Notes

<table>
<thead>
<tr>
<th>CA Math Standards</th>
<th>Grade</th>
<th>Strand</th>
<th>No.</th>
<th>Standard Description</th>
</tr>
</thead>
</table>

Attending to English Learners' needs through differentiated instruction: Total Physical Response; building on prior knowledge; using realia/tools/manipulatives; working with partners; acting things out; comprehension checks; accepting responses at student level; allowing enough wait time; moving thoughtfully from concrete to abstract; planning meaningful practice.

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<thead>
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<td>Anticipate student responses:</td>
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<tr>
<td>Purpose &amp; expectations of lesson clarified:</td>
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</tr>
<tr>
<td>Introduction to problem/task:</td>
<td></td>
<td>Target Vocabulary:</td>
<td></td>
</tr>
<tr>
<td>Verify that students understand problem:</td>
<td>Students work individually:</td>
<td></td>
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<tr>
<td>Prompts to help students access problem:</td>
<td></td>
<td>Sentence Frames:</td>
<td></td>
</tr>
<tr>
<td>Students work with others:</td>
<td></td>
<td>Visuals for Support</td>
<td></td>
</tr>
<tr>
<td>Prompts to help students make leaps:</td>
<td>Anticipate student responses:</td>
<td></td>
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</tr>
<tr>
<td>Look for work that demonstrates:</td>
<td>Anticipate student responses:</td>
<td>Guided Reporting</td>
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</tr>
<tr>
<td>Selected work presented to class (concrete to abstract):</td>
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<tr>
<td>Summary points making mathematics explicit:</td>
<td></td>
<td></td>
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<tr>
<td>Homework:</td>
<td>Reflection:</td>
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</tbody>
</table>
Levels of English Language Proficiency

Comprehends detailed information with fewer contextual clues on unfamiliar topics; produce, initiate & sustain spontaneous language interactions using circumlocution when necessary, interact with increasingly complex written material while relying on text and prior knowledge to obtain meaning from print; write to satisfy limited social & academic needs via the recombination of learned vocabulary & structures; participates actively in all content areas; express more complex feelings, needs/ideas/opinions via extended oral & written productions; & participates actively in non-academic settings requiring English.

Comprehends concrete and abstract topics and recognizes language subtexts in a variety of communicative settings; produce, initiate, and sustain extended interactions tailored to specific purposes and audiences; read, with a limited number of comprehension difficulties, grade-level written material; write to meet most social needs and academic demands for specific purposes and audiences and audiences; participate fully in all content areas at grade level; express and satisfy personal and safety needs in a wide variety of settings; and participate fully in non-academic settings requiring English.

Comprehends a sequence of information on familiar topics presented through stories and face-to-face conversations; produces basic statements & asks questions in direct informational exchanges on familiarroutine subjects, interacts w/ variety of familiar ptn., using previously learned words/phrases; writes basic personal information & short, responses within structured context; uses high frequency vocabulary drawn from other content areas; expresses basic personal and safety needs; responds to questions & simple phrases; participate in simple, face-to-face conversations.

Comprehends information on familiar topics in contextualized settings; produces sustained conversation on expanding variety of general topics; interacts independently with a variety of simplifiers, print; writes basic information and expanded responses in contextualized settings; comprehend main ideas and basic concepts in content areas; express a variety of personal and safety needs and respond to questions in short sentences; & initiate simple conversations with English speakers outside of schools.

Understands high frequency words & basic phrases in immediate & concrete surrounding; produces learned words, phrases & gestures to communicate needs; interacts with frequently-used English print in a limited fashion; demonstrates initial English print awareness; demonstrates understanding and writes familiar words, phrases & questions drawn from content areas; follows classroom routines/schedules; expresses basic personal & safety needs; responds to questions with on/two word answers; uses social conventions.
### Sample Academic Forms and Functions in Mathematics

<table>
<thead>
<tr>
<th>Function</th>
<th>Target Forms</th>
<th>Beginning/Early Intermediate</th>
<th>Intermediate</th>
<th>Early Advanced/Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describing Nouns</td>
<td>Nouns, Pronouns, Adjectives</td>
<td>A _____ has _____</td>
<td>A _____ has _____, _____, and _____ may not be _____</td>
<td>A _____ always has _____, but _____ are not always _____</td>
</tr>
<tr>
<td>Categorizing</td>
<td>Nouns, Adjectives</td>
<td>A _____ is a ______</td>
<td>A _____ is a _____ because ______</td>
<td>A _____ is a ______ because ______. It is not ______ because ______</td>
</tr>
<tr>
<td>Describing Location</td>
<td>Verb tenses, Adverbs</td>
<td>I am putting the _____ next to the _____</td>
<td>The _____ was next to the ______. _____ made a ______</td>
<td>While the _____ and the _____ are unique shapes, together _____ make a ______</td>
</tr>
<tr>
<td>Comparing / Contrasting</td>
<td>Adjectives and Conjunctions Comparative Adjectives</td>
<td>A _____ has ______</td>
<td>A _____ has _____, but a _____ has ______. Both have ______.</td>
<td>While a _____ and a _____ both have ______, a _____’s _____ are always ______, but a _____’s may not always be ______</td>
</tr>
<tr>
<td>Summarize</td>
<td>Compound sentences</td>
<td>_____ have _____ and ______.</td>
<td>_____ always have ______. The _____ are not always the same size.</td>
<td>In conclusion, _____ have _____ and ______, however _____ are not always congruent.</td>
</tr>
<tr>
<td>Sequence</td>
<td>Adverbs that order (first, third) Conjunctions with time (then, next)</td>
<td>First I put the ______. Second I put the ______.</td>
<td>I put the _____, then the ______.</td>
<td>Whenever I placed the ______ beside the ______, created a ______.</td>
</tr>
<tr>
<td>Giving/Following Directions</td>
<td>Imperative statements Present, present progressive tenses</td>
<td>Pick up the ______.</td>
<td>Place the ______ on the right of the ______.</td>
<td>If I put the ______ next to the _____, then it will be a ______.</td>
</tr>
<tr>
<td>Hypothesizing</td>
<td>Future and conditional tenses Auxiliary verbs</td>
<td>N/A</td>
<td>If the _____ next to the _____, I will make a ______.</td>
<td>I ought to create a ______ by placing the _____ and the ______ together.</td>
</tr>
<tr>
<td>Predicting</td>
<td>Future and conditional verbs</td>
<td>The _____ will have _____</td>
<td>A _____ and a _____ will make a ______.</td>
<td>If the _____ had been placed beside the _____, it would have been ______.</td>
</tr>
<tr>
<td>Making inferences</td>
<td>Future tense verbs Auxiliary verbs</td>
<td>N/A</td>
<td>A _____ and a _____ will make a ______.</td>
<td>Connecting a _____ and a _____ will create a ______.</td>
</tr>
<tr>
<td>Drawing conclusions</td>
<td>Comparative adjectives</td>
<td>N/A</td>
<td>_____s are stronger because _____ have _____</td>
<td>Connecting a _____ and a _____ will create a ______.</td>
</tr>
<tr>
<td>Cause/Effect</td>
<td>Past tense and conditional verbs</td>
<td>The _____ and the _____ made a ______</td>
<td>Together the _____ and the _____ make a trapzoid.</td>
<td>If we hadn’t put the ______ and the _____ together we wouldn’t have made a ______.</td>
</tr>
</tbody>
</table>
2. My shape has 4 vertices.

My shape has 2 pairs of parallel lines.

My shape has 4 right angles, and it's not congruent to any other shape.
My shape has 4 right angles
but my shape does not have 3 sides.

My shape has an acute angle
but my shape does not have vertex.

My shape has congruent
but my shape does not have parallel lines.
My shape does not have a right angle.

My shape does not have a hypotenuse.

My shape is not similar.
My shape has not four right angles.
My shape has not parallel lines.
My shape do not have four sides.
My shape do not have a obtuse angle.
My shape has not Right angle.
My shape has not congruent.
My shape has not polygon.
My shape has not congruent.
• My shape has four sides
• My shape is less than 90°
• My shape is kind of little

• My shape has three sides
  1. **My shape is has**
  2. **Obtuse angle acute angle**
  3. My shape is bigger

• My shape does not have a **right angle**
• My shape is not 90°
• My shape has four sides
My shape has an acute angle
My shape has two acute angles
My shape has two obtuse angles
My shape is bigger

My shape does not have an obtuse angle
My shape does not have four sides
My shape is not bigger than the other one
My shape is bigger than the other one
My shape has a right angle
My shape has parallel lines
My shape has more right angles
My shape does not have two obtuse angles
My shape does not have two acute angles

My shape has an acute angle, but does not have an obtuse angle
My shape has a right angle, and is not the smallest

My shape is congruent to another shape, but this is not smaller than the other one
<table>
<thead>
<tr>
<th>Group</th>
<th>Processing</th>
<th>Visualization</th>
<th>Integrating</th>
<th>Reflecting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Group</td>
<td></td>
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<td>Random Selection</td>
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<tr>
<td>Small Group</td>
<td></td>
<td>Concept Map</td>
<td></td>
<td>Jigsaw</td>
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<tr>
<td>Pair</td>
<td>Think - Pair - Share</td>
<td></td>
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<tr>
<td>Individual</td>
<td>Whip Around</td>
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</tbody>
</table>
Sample Structures for Practicing Academic Language

Think-Pair-Share: Pairs of students are given a question or a problem. They think quietly of an answer or solution. They discuss their response with their partner. One partner shares with the entire class.

Give One/Get One: Partners receive a worksheet to discuss and complete. One partner gives an answer, the other agrees or gives the correct answer.

Three Step Interview: Students form pairs and one partner interviews the other on a topic for two or three minutes; partners switch roles. Two pairs combine to form groups of four. Each group member introduces his or her partner, sharing the information from the original interview.

Jigsaw: Each member of a home group is assigned a topic to research. Students then meet in expert groups with others assigned the same topic to discuss and refine their understanding. Students return to their home groups and members teach their topics to each other.

Numbered Heads Together: In teams of four, each student is assigned a number (1-4). A problem or question is presented. Groups discuss topic for a set amount of time. Teacher calls out a number after randomly selecting a numbered card from a deck, a spinner, or some other form of selection. The person whose number is called reports for the group.

Roundtable: Groups of three or more students brainstorm on a topic. Each member takes a turn to write down one new idea on a single piece of paper. The process continues until members run out of ideas. One group member is reporter for the group.

Whip Around: A question or problem that requires a short answer (one or two word responses) is asked. Teacher whips around the room calling on each student to reply with their answer.

Talking Chips: Each member receives the same number of chips (plastic markers, pennies ...). Each time a member wishes to speak, he or she tosses chip into the center of the table. Once individuals have used up their chips, they can no longer speak. The discussion proceeds until all members have exhausted their chips.

Co-op Cards: Each partner in a pair prepares a set of flashcards with a question or a problem on the front and correct answer(s) on the back. One partner quizzes the other until the latter answers all the questions or problems in the set correctly. Then they switch roles and use the other set of flashcards.

Send a Problem: A group writes a question or problem on a flashcard. The group reaches consensus on the correct answer(s) or solution and writes it on the back. Each group then passes its card to another group. The new group answers the problem without looking at the previous answer. They list their agreed-upon answer on the back of the card. Cards rotate until the reach their original group. This group checks and compares all the answers listed on the cards.

Think-aloud Pair Problem-solving: Students are paired off, assigned a role of problem solver (student A), or listener (student B). Present a problem to solve. Student A solves the problem by talking aloud, while student B encourages, supports, and asks questions (to help with the solution). Randomly select a group and ask them to present the solution to the class. Present a second problem, but this time ask the students in pair to reverse roles.

Thumbs Up/Thumbs Down: The teacher poses a question or a problem that can be answered yes or no. At the teacher’s signal the entire class responds by showing thumbs up or down.

Group Concept Mapping: Similar to the individual concept map, groups discuss ideas and information. They cluster ideas on a paper and draw connections.

Response Sticks: Have each student write their name on a popsicle stick or tongue depressor. Keep sticks in a cup at your teaching station. When asking questions pull one stick out and ask that student to answer.
### Visuals for Academic Language

<table>
<thead>
<tr>
<th></th>
<th>Describing</th>
<th>Comparing / Contrasting</th>
<th>Classifying</th>
<th>Sequencing</th>
<th>Summarizing</th>
<th>Problem Solving</th>
<th>Hypothesizing</th>
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</thead>
<tbody>
<tr>
<td>Charts</td>
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<td>Dictionaries</td>
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<td>Graphs</td>
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<td>Venn Diagrams</td>
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<tr>
<td>Concept Mapping</td>
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<td>Matrix</td>
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<td>Flow Charts</td>
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</tbody>
</table>
Sample Visuals for Academic Language

**Chain of Events**: Used to describe the stages of the steps in a procedure.

![Chain of Events Diagram](image)

**Picture Input**: Used to develop understanding of topic and vocabulary.

![Picture Input Diagram](image)

**Compare / Contrast**: Used to show relationships between two items.

![Compare / Contrast Diagram](image)

**Clustering**: Used to generate ideas and identify patterns around a stimulus word.

![Clustering Diagram](image)

**Continuum**: Used for showing degrees of something or rating scales.

![Continuum Diagram](image)

**Double Cell Diagram**: Used to describe two items linked by characteristics or attributes.

![Double Cell Diagram](image)

**KWHL Chart**: Used for planning and gathering initial information.

Critical Questions:
- What do we already know?
- What do we want to find out?
- What did we learn?

<table>
<thead>
<tr>
<th>Know</th>
<th>Find out</th>
<th>Learn</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**Concept Map**: Used to describe a central idea—a thing, a process, a concept, a proposition.

![Concept Map](image)
Reflecting on Learning

Expressing Opinion
I think…
I believe / imagine / predict / hypothesize…
It seems to me that…
In my opinion…
I agree with ________________ that…
My idea is similar / related to ________________’s idea.
Not everyone will agree with me, but…
I conclude / deduce / suspect / speculate…
As ________________ already pointed out, it seems to me…

Individual Reporting
I found out that…
I learned / heard / discovered that…
_______________ told me…
_______________ explained to me…
_______________ mentioned / emphasized that…
_______________ shared with me…

Outcome Statements
I learned…
I discovered…
I was surprised that…
I now realize…
I want to find out more about…
I am beginning to wonder about…

Partner / Group Reporting
We decided / agreed that…
We concluded that…
We noticed that…
Our group sees it differently.
We have different opinions. Some of us believe that… One group member thinks…
We had a different approach / idea / answer / solution.

Excerpt from ELLA by Vanessa Girard, West Ed. 2003
Response Sentence Frames

I learned that __________________________ .

I understand that __________________________ .

I will __________________________ .

My ________________________ instruction will include ________________________ .

I want to know more about __________________________ .

First share your response with your partner. Then, share your partner’s response with another pair.
<table>
<thead>
<tr>
<th>CA Math Standards</th>
<th>Grade</th>
<th>Strand</th>
<th>No.</th>
<th>Standard Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Math Reasoning 1.1</td>
<td>Analyze problems by identifying relationships, distinguishing relevant from irrelevant information ... Sequencing and prioritizing information, and observing patterns.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.2</td>
<td>Apply strategies and results from simpler problems to more complex problems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.4</td>
<td>Use a variety of methods such as words, symbols... diagrams, and models, to explain mathematical reasoning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>Express the solution clearly and logically by using the appropriate mathematical ... terms in clear language; support solutions with evidence in both verbal and ... Work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.3</td>
<td>Develop generalizations of the results obtained and the strategies used and apply them in new problem situations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key standard</td>
<td>3</td>
<td>Measurement &amp; Geometry 2.1</td>
<td>Identify, describe, and classify polygons (including pentagons, hexagons, and octagons)</td>
<td></td>
</tr>
<tr>
<td>Key standard</td>
<td>3</td>
<td>Identify attributes of triangles (e.g., two equal sides for the isosceles triangle, three equal sides for the equilateral triangles, right angle for the right triangle).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key standard</td>
<td>3</td>
<td>Identify attributes of quadrilaterals (e.g., parallel sides for the parallelogram, right angles for the rectangle, equal sides and right angles for the square)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Identify right angles in geometric figures or in appropriate objects and determine whether other angles are greater or less than a right angle.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Identify lines that are parallel and perpendicular.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Identify congruent figures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Know the definitions of a right angle, an acute angle, and an obtuse angle. ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Know the definitions of different triangles (e.g., equilateral, isosceles, scalene) and identify their attributes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Know the definition of different quadrilaterals (e.g., rhombus, square, rectangle, parallelogram, trapezoid).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key standard</td>
<td>5</td>
<td>Measure, identify, and draw angles, perpendicular and parallel lines, rectangles, and triangles by using appropriate tools (e.g., straightedge, ruler, compass, protractor, drawing software)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key standard</td>
<td>5</td>
<td>Know that the sum of the angles of any triangle is 180° and the sum of the angles of any quadrilateral is 360° and use this information to solve problems.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Key Standard 6

| 2.2 | Use the properties of complementary and supplementary angles and the sum of the angles of a triangle to solve problems involving an unknown angle. |
| 2.3 | Draw quadrilaterals and triangles from given information about them (e.g., a quadrilateral having equal sides but no right angles, a right isosceles triangle). |

*Attending to English Learner's needs through differentiated instruction: Total Physical Response; building on prior knowledge; using realia tools / manipulatives; working with partners; acting things out; comprehension checks; accepting responses at student level; allowing enough wait time; moving thoughtfully from concrete to abstract; planning meaningful practice.*

<table>
<thead>
<tr>
<th><strong>TEACHER Perspective</strong></th>
<th><strong>STUDENT Perspective</strong></th>
<th><strong>Vocabulary, Preparation Materials, Remarks</strong></th>
<th><strong>Time</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Presentation &amp; Instruction</strong></td>
<td><strong>Student Strategies</strong></td>
<td><strong>Vocabulary (prior)</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>Teacher Strategies</strong></td>
<td></td>
<td>Polygon, triangles, shape, base, hypotenuse, right angle, Side, height, square, vertex, vertices, parallelogram, acute, obtuse, quadrilateral</td>
<td></td>
</tr>
<tr>
<td>Connect to vocabulary</td>
<td>Students have either their personal math dictionary or tangram pieces</td>
<td><strong>Target vocabulary</strong></td>
<td></td>
</tr>
<tr>
<td>Student A works with personal dictionaries.</td>
<td></td>
<td>Similar, congruent, does not have</td>
<td></td>
</tr>
<tr>
<td>Student B works with tangram shapes</td>
<td></td>
<td><strong>Materials</strong></td>
<td>5-10</td>
</tr>
<tr>
<td>Teacher says: “Find the hypotenuse on tangram shape or dictionary and put your finger on it. Show your partner the hypotenuse in the dictionary and on the shape. Do they match?” Attributes: parallel, perpendicular, hypotenuse, right angle, acute angle, obtuse angle, vertices, vertex, congruent, similar, polygon, quadrilateral</td>
<td>Students point to the visual according to the attribute the teacher is describing. Students can observe teacher modeling to verify correctness.</td>
<td>- Charts on walls of vocabulary &amp; pictures - Chart with pictures - Personal content dictionaries - Journal page - Tangrams (each) - Basket of extra tangram pieces - Geo-wall / textbook - Overhead &amp; pens - Pencils - Chart with sentence stems</td>
<td></td>
</tr>
<tr>
<td><strong>Inventory shapes(s):</strong></td>
<td>Students respond when teacher asks for further explanation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Please get out your tangrams and make sure you have 7 pieces. What's another word for “shape”? (polygon) Pick up the two large triangles and bounce the bases together. Bounce the two congruent triangles together. Bounce the two hypotenuses together. Pick up the two small triangles and touch the right angles together. Pick up the final triangle and hold it so one side goes straight up. Climb up the height and slide down the hypotenuse. Pick up your square. How many right angles? Touch all four vertices. Pick up the piece that has two sets of parallel lines.</td>
<td>Students use their geometry dictionaries / journals or wall charts if needed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Purpose & expectations of lesson clarified:**

Today we're going to practice using our math vocabulary and using the vocabulary in a sentence structure.

<table>
<thead>
<tr>
<th>Introduce the task:</th>
<th>Anticipated student response</th>
<th>Preparation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>We're going to play a game together. You will play it with your partner in a few minutes. You will use the clues your partner gives you to eliminate shapes. At the end of the game, you will have one shape left.</td>
<td>Students will use vocabulary to describe each shape</td>
<td>Chart with sentence builders:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;My piece has ___&quot;.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;My piece does not have ___.&quot;</td>
</tr>
</tbody>
</table>

**First we're going to learn how to write clues for the Round 1 Game:**

I'll show how we're going to write the clues. I'm going to give you clues about a shape on the overhead.

Teacher writes clues on overhead.

**Write down: "My shape has a right angle."**

- What shape is eliminated by my clue?
- How many pieces do you have left?

**Write down "My shape has two acute angles"**

- What shape(s) is eliminated by my clue?
- How many pieces do you have left?

**Write down: "My shape is congruent with another shape."**

- What shape(s) is eliminated by my clue?
- How many do you have left?
- What's the name of that (those) shapes?

**Can we positively know which shape is hidden?**

(Thumbs up – yes; thumbs down – no; thumbs sideways - not sure)

- How many pieces are left that have not been eliminated?
- How can we write the next sentence to decide which piece is left?

<table>
<thead>
<tr>
<th>Anticipated Student Responses</th>
<th>Preparation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The parallelogram is eliminated because it has no right angles.</td>
<td>Chart with sentence builders:</td>
</tr>
<tr>
<td>The square is eliminated because it has no acute angles.</td>
<td>&quot;My piece has ___&quot;.</td>
</tr>
<tr>
<td>The mid-sized triangle is eliminated.</td>
<td>&quot;My piece does not have ___.&quot;</td>
</tr>
<tr>
<td>4 triangles are left.</td>
<td></td>
</tr>
<tr>
<td>We know it is a triangle, but we do not know whether it is the large or small triangle.</td>
<td></td>
</tr>
<tr>
<td>There are four triangles left.</td>
<td></td>
</tr>
<tr>
<td>Larger / smaller</td>
<td></td>
</tr>
</tbody>
</table>
My piece is larger / smaller than the ____________.
My piece is larger than the small triangle, or
My piece is smaller than the largest triangle.

After, I've given you all the clues, you can guess what the shape is and tell me how you used the clues to figure it out.

Students verify identified found correct shape by explaining reasons and then see teacher shape on overhead.

Now we'll learn how to play the game.

Students write clues for Round 1
Work with your partner
Put up your Geo-Wall between you.
Each partner will choose a shape and think of three clues using sentence frames.
Write the three clues down.
Students write down clues for Round 1
  • My shape has __________
  • My shape has __________
  • My shape has __________

Students play Round 1
After writing the clues down, Partner A will read his/her clues one at a time. Each time asking which shape can be eliminated and how many pieces are left.
Partner B will try to decide which shape is being described and explain how s/he solved the problem.
Then partners will switch roles, and Partner B will read clues and Partner A will try to figure out which shape s/he is describing and explain how s/he solved the problem.

Debrief Round 1
Teacher says,
"Hold up the shape you ended up with. Will someone tell me the clues?"
Teacher records rules on board.
"How did you know?"

Anticipate student response.
Use of verbs in positive statements to accurately describe the polygon.

"My shape has __________"
  "Which shape can you eliminate? Why?"
  "How many pieces do you have left?"
"My shape has __________"
  "Which shape can you eliminate? Why?"
  "How many pieces do you have left?"
"My shape has __________"
  "Which shape can you eliminate? Why?"
  "How many pieces do you have left?"
"What is the name of my shape?"

I know my shape is a ____, because it has _______ and ________

Discussion about shape, and polygon. Mathematically, polygon is better.
*Listen to see which word student use

Anticipate student response.
Student 1
  • My piece has 4 vertices.
  • My shape has 4 sides.
  • My shape has two sets of parallel lines

Student 2
  • Mine has 3 sides.
  • Mine has one 90°.
  • Mine has __________

Student 3
  • Mine has 2 acute angles.
  • Mine is a polygon
  • Mine has a hypotenuse

Student 4
  • My piece has 4 vertices
  • My piece is a polygon
  • My piece has 4 equal sides.
### Round 2
Each student chooses a piece and thinks of 3 clues using sentence stem:

- My shape does not have ____________.

This is oral without writing down clues.
- "My shape does not have ____________.
- "Which shape can you eliminate? Why?"
- "How many pieces are left?"
- "My shape does not have ____________.
- "Which shape can you eliminate? Why?"
- "How many pieces are left?"
- "What is the name of my shape? Why?"

Prompts to help students with negative stems.
- Build sentence builders.
- "What does it not have?"
- "It does not have _____."

Sort shapes by:
- "All these shapes are _____."
- "All these shapes are not _____."

### Teacher Cables

<table>
<thead>
<tr>
<th>Assessment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>My shape has _____ but does not have _____.</td>
</tr>
</tbody>
</table>

### Use of verbs in negative statements to accurately describe the polygon.

Student gives all three clues then asks for solution.

### Anticipated Student Response:

- My shape does not have parallel lines.
- My shape does not have 4 sides.
- My shape does not have acute angles.

- My piece does not have 4 sides.
- My piece does not have 4 vertices.
- My shape does not have 90°.
- My shape does not have an obtuse angle.
Round 3
Teacher adds comparative structures to word bank
("more than", "less than", "taller than", "equal to",
"smaller than", "similar", "congruent")

Students write clues in pairs.
Students in pairs each write 3 clues using sentence frame.

   My shape has  , but my shape does not have  .

Students play game with another pair.
Pairs of students give clues to each other.

Teacher Debriefs
Students hold up the shape left, and tell teacher clues.
Teacher records in the following sentence.

   My shape is a  because it has  . (However but) my shape is not a  because it does not have.
**Prompts to help students with comparative language**

| “My figure is _______ than ________”  | Students respond in more complex sentences, with more detail using newly acquired vocabulary to experiment and form messages. |
| “When I compare my shape to all of the other shapes, I see ________.” | **Assessment point** |
| My shape is different from the ________ because it ________ | |

| Summary points making mathematics explicit: |
| Vocabulary (identified in standards) is used to describe shapes (grade level standards). | Students write in journal using frames with content word banks and other supports |

| Possible reflection |
| My shape is a ______, because it has ______, but my shape is not a ______, because it does not have ______. | |
Standards-Based Instruction for English Language Learners

By Joseph Laturnau

This paper will examine the potential benefits of standards-based instruction for English Language Learners (ELLs), present a backward mapping process for designing standards-based instructional units, and review the design of two standards-based units for ELLs.

Standards-Based Instruction and ELLs
Standards-based instruction (SBI) is at the forefront of education reform because it presents a way to ensure that all students are exposed to challenging curricula and prepared to contribute positively to an increasingly complex world. SBI is characterized by content standards, which define what students should know and be able to do, benchmarks, which identify the expected understandings and skills for a content standard at different grade levels, and performance standards (or indicators), which describe how well students need to achieve in order to meet content standards.

By focusing on detailed descriptions of expected understandings—learning targets—SBI engages teachers in raising the expectations for all students, promotes the use of multiple assessment strategies which allow for students to reach proficient levels at different times and in a variety of ways, and requires teachers to differentiate instruction to meet the readiness levels, learning profiles, and interests of students.

ELLs need to be included in standards-based educational reform. According to Hakuta (2001), clear academic standards must be in place to confirm that ELLs should be held to the same expectations as mainstream students. Hakuta cautions, however:

It is unreasonable to expect ELLs to perform comparably to their native English-speaking peers in their initial years of schooling (hence the need for standards specific to ELLs) and holding them to this expectation too early in their educational careers can be detrimental to

* Joseph Laturnau is a Program Specialist with the Pacific Comprehensive Regional Assistance Center at PREL. Special thanks to Michael Power, Everett School District (WA), and to Tom Barlow, Joanne Sebastian Morris, Monica Mann, Tim Donahue, Hilda Heine, and Canisius Filibert at PREL for their comments and suggestions. Comments about this paper can be addressed to laturnaj@prel.org.
their academic progress, not to mention their self-esteem. The problem enters when students are not pushed to go beyond this stage over time, are presumed to be at an elementary level, or are misdiagnosed as having educational disabilities by teachers unfamiliar with the needs of ELLs. (p. 3)

The gap between learning expectations as described in standards, particularly language arts standards, and the performance of ELLs as tempered by their initial and temporary limited English proficiency is in some cases widened by limited formal schooling. Two prominent efforts to bridge this gap have been undertaken by the California Department of Education (CDE) and the Teachers of English to Speakers of Other Languages, Inc. (TESOL), a professional organization. CDE (1999) has produced English Language Development (ELD) Standards to assist teachers in moving ELLs to English fluency and to proficiency on the California English–Language Arts Content Standards. CDE has delineated five incremental levels of language proficiency (i.e., beginning, early-intermediate, intermediate, early-advanced, and advanced) and identified the linguistic competencies ELLs must develop to “catch up” with their monolingual English-speaking peers.

TESOL’s English as a Second Language (ESL) Standards revolve around three goals for ELLs: (1) to use English to communicate in social settings, (2) to use English to achieve academically in all content areas, and (3) to use English in socially and culturally appropriate ways. Agor (2000), Irujo (2000), Samway (2000), and Smallwood (2000) provide sample PreK-12 units that describe how teachers use standards as planning tools, observational aids, assessment guides, and ways of understanding language development. Snow (2000) discusses ways to help prospective and practicing teachers implement the ESL Standards.

What promise does a shift to SBI hold for ELLs? Figure 1 below highlights key SBI teacher practices (adapted from Lachat, 1998) and their implications for ELLs.

<table>
<thead>
<tr>
<th>In Standards-Based Instruction, teachers . . .</th>
<th>The potential benefits for ELLs are that this shift . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organize learning around what students need to know and be able to do to reach high levels of performance.</td>
<td>Has the potential to reverse the tendency to assign ELLs to unchallenging curricula and presents an opportunity for schools to engage in substantive communication with the parents of ELLs regarding achievement.</td>
</tr>
<tr>
<td>Broaden the focus of their teaching to include higher order thinking processes.</td>
<td>Sets high learning expectations for ELLs, who have traditionally been provided with instruction focusing on low-level skills.</td>
</tr>
<tr>
<td>Guide student inquiry by giving students work related to real-life tasks that require reasoning and problem-solving.</td>
<td>Allows ELLs to build upon their prior knowledge and provides for diverse ways of solving problems.</td>
</tr>
<tr>
<td>Emphasize holistic concepts rather than fragmented units of information.</td>
<td>Focuses more on how ELLs think and what they understand rather than on whether or not they have the one right answer.</td>
</tr>
</tbody>
</table>
In Standards-Based Instruction, teachers . . .  

<table>
<thead>
<tr>
<th>In Standards-Based Instruction, teachers . . .</th>
<th>The potential benefits for ELLs are that this shift . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide a variety of opportunities for students to explore and develop their understanding of concepts and situations over time.</td>
<td>Helps teachers understand how ELLs learn, places value on the linguistic and cultural backgrounds of ELLs, and allows ELLs to draft, reflect on, and revise their work.</td>
</tr>
<tr>
<td>Use multiple sources of information rather than a single text.</td>
<td>Allows for a variety of learning styles and offers multiple pathways and connections to academic success.</td>
</tr>
<tr>
<td>Work in interdisciplinary teams.</td>
<td>Improves communication between regular education and ELL staff and encourages an open dialogue about a school’s expectations for ELLs.</td>
</tr>
<tr>
<td>Use multiple forms of assessment to gather concrete evidence of student proficiencies and achievement.</td>
<td>Complements diverse ways of knowing and learning and reveals productive “entry points” that build on students’ strengths and lead to new areas of learning.</td>
</tr>
</tbody>
</table>

In summary, these practices point to significant changes in classroom practices and learning environments that have great potential for improving the educational outcomes of ELLs. Given the challenges they face in learning an unfamiliar curriculum in a second language and in a different culture and school setting, many ELLs have difficulty negotiating the routines and expectations of the classroom. Tomlinson (2001) stresses the importance of the atmosphere of the classroom and school: Atmosphere will signal without ambiguity whether the classroom is a place in which making a mistake is considered part of the natural learning process or a punishable event; varied ideas and perspectives are celebrated or rejected; diverse languages, cultures, and economic statusses are valued or problematic; and a student’s current degree of skill and understanding is acceptable or inconvenient. (p. 45)

**Designing Standards-Based Instructional Units**

Latchat (1998) describes traditional approaches to schooling as often textbook-driven, characterized by an emphasis on “covering” the curriculum, and highly activity-based. Activity-based instruction typically includes three components. First is the selection of a topic from the curriculum, second is the design and presentation of instructional activities, and third is an assessment. Unfortunately, the demands and evaluative criteria of the final assessment are often kept secret from students, and once a grade or feedback is given, it is time to move on to a new topic, regardless of how much or how well students learned. Additionally, activities are often chosen primarily because they are fun and engaging for students (e.g., dinosaurs, rainforests) with little regard to what standards and benchmarks need to be taught and at what grade levels.

Current literature on planning for SBI (Mitchell et al., 1995; Wiggins & McTighe, 1998), advocates some form of backward mapping or backward planning, in which specific learning goals are identified and plans are made to ensure that those goals are achieved. Wiggins and McTighe delineate three stages in their backward design process: (1) identify desired results; (2) determine acceptable
evidence; and (3) plan learning experiences and instruction. This briefing paper suggests a similar backward mapping process to aid teachers in designing SBI for ELLs. Figure 2 below is a graphic illustration of the process.

**Figure 2**

1. **IDENTIFY DESIRED RESULTS**

   Culminating Task and Assessment
   Driving Question

2. **DETERMINE ACCEPTABLE EVIDENCE**

   Learning Experiences

3. **PLAN LEARNING EXPERIENCES AND INSTRUCTION**

   Standards
   “Big Ideas”
   Concepts
   Skills
   Knowledge
**Identify Desired Results**

The Standards oval in Figure 2 represents Wiggins’ and McTighe’s “identify desired results” stage. The desired results are the standards being targeted. When designing an SBI unit, it is best to cluster standards, that is, to target a few standards that fit well together. For example, in a unit focusing on the U.S. Constitution, a teacher may choose some history and political science standards, as well as some language arts standards. A target of no more than three or four standards is suggested because the teacher needs to focus on standards that can be taught and assessed reasonably and effectively.

It is imperative that teachers understand what the standards and grade-appropriate benchmarks mean in regard to what student learning would look like. One strategy is to look closely at the verbs and the nouns in the standard. The verbs usually indicate the action the students need to take, and the nouns often represent the content or concepts. For example, a grades 6-8 history benchmark states, “Identify possible causal relationships in historical chronologies” (*Hawai'i Content and Performance Standards II* [HCPS II], Social Studies, 1999, p. 5). The important concepts are causal relationships and historical chronologies, and the students need to be able to identify them. But what does identify mean? If a student simply lists three causes of the American Civil War, is that adequate? It is at this point in the planning process that teachers need to be able to articulate learning goals. Perhaps most teachers would agree that in this example, in addition to identifying the causes, students would also be asked to explain and justify their findings.

Another strategy teachers can use when seeking a better understanding of state standards is to refer to standards published by national professional organizations (e.g., the National Council of Teachers of Mathematics, the National Council of Teachers of English), which tend to be more descriptive and in depth. One valuable resource that covers all subject areas is *Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education* (Kendall & Marzano, 1996), which is also available online at http://www.mcrel.org/standards-benchmarks/.

Also represented in the oval in Figure 2 are the concepts, skills, and knowledge of the discipline and content. Attention to these overarching “big ideas” grounds teachers in thinking about what students need to know and be able to do. Reflective questions such as “What do social scientists do?” or a review of statements like “The primary purpose of social studies is to help young people develop the ability to make informed and reasoned decisions for the public good as citizens of a culturally diverse democratic society in an interdependent world” (*HCPS II, Social Studies*, 1999, p. 1) help teachers to plan units which get to the heart of the discipline.

**Determine Acceptable Results**

The arrow in Figure 2 that points down from the Standards oval to the Culminating Task and Assessment rectangle represents the next step in the process in which acceptable evidence is determined. This step represents a fundamental difference from traditional activity-oriented instructional practices. According to Wiggins and McTighe (1998):

> The challenge is to postpone all thinking about what specific learning activities should frame a unit until the culminating performance tasks and other assessments are clear. *Educators need to know precisely what performances are required by the end of the unit before they can know what specific experiences and learnings need to occur* [italics added]. (p. 41)

When designing the culminating task and assessment, it is important to consider the continuum of assessment methods (Wiggins & McTighe, 1998) to be used throughout the unit. For example, informal checks for understanding, observations, quizzes, academic prompts, and projects all vary in terms of complexity, time frame, setting, and structure.
For the purposes of this discussion the culminating (or performance) task and assessment refers to a project-based activity. It is an engaging real-world activity that embodies all the selected standards and gives students a reason to achieve them. The task must directly match the standards identified, it must clearly describe expectations of students, and it must include specific criteria to evaluate quality. Culminating tasks are designed to build students’ background knowledge, deepen their understanding, and result in applied learning. Additionally, culminating tasks typically seek to engage students in adult-like behavior, may include external audiences, and often require students to use technology to present what they have learned. Reference to state or district performance standards (or indicators) for the selected content standards can assist teachers in designing the culminating task and assessment.

Key to the second stage of the backward mapping process is one or more “driving” questions (sometimes referred to in various literature as “essential,” “guiding,” or “unit” questions), which are designed to stimulate student interest, energize instruction, and provide an unambiguous focus for the entire unit. Driving questions need to be open-ended, have the potential for in-depth investigation, and connect to real-world issues. Driving questions typically start with “how” or “why.” The culminating task in Mitchell et al. (1995, p. 8) is stated as follows:

Students will plan, organize, and carry out for the community a Pure Water Day. The day’s activities will focus on issues of water purity in the community. These activities will be designed to answer the driving question: “How is the quality of our community’s water affected by individual uses of land?”

The culminating task encourages student responsibility because the evaluative criteria are created (with student input if possible) before the unit is started and shared with students. Ideally, students are provided with exemplars to clarify learning expectations. Exemplars combine examples of student work at different levels of proficiency with teacher commentary on the quality of student work when compared to the desired outcomes. For example, if students were required to write a research paper about the causes of the American Civil War, the teacher could provide them with examples of student papers about the causes of the American Revolutionary War that exceeded, met, or didn’t meet standards. From these samples, students can obtain a better understanding of how arguments can be presented, how a variety of informational sources can be incorporated, and how causal relationships can be explained.

The task’s performance assessment asks students to synthesize information and to show and justify what they know, emphasizes important learning/concepts, and is designed with complex and multiple steps to stretch student thinking. When appropriately constructed, performance assessments ensure real world applications of student learning, meaningfully connect instruction with the discipline’s big ideas and concepts, allow for a variety of student differences, and present opportunities for improving communication between schools and parents concerning student achievement.

Moon and Callahan (2001, pp. 54-55) present students with these instructions for the culminating task:

Throughout history, progress (social, technological, artistic, etc.) has led people to believe that the time in which they are living is, in many ways, “the best of times.” You have been employed by PBS to create a documentary from a particular historical era that will reflect on why that era was “the best of times” . . . . From the perspective of your new role, write an essay or develop a monologue to be presented to the class that will convince others that, for you, these are “the best of times.”

Along with this scenario, students are provided with a three-point scoring rubric that describes performances that exceed, meet, or fall below expectations in the areas of historical accuracy, perspectives/point of view, persuasiveness, thoroughness, research skills, and referencing skills.

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Plan Learning Experiences and Instruction

The arrow in Figure 2 that points down from the Culminating Task rectangle to the Learning Experiences triangle indicates that the selection and sequencing of instructional experiences and activities take place after the culminating task and assessment are determined. Again, this constitutes a significant difference between activity-based instruction, in which activities are the means and ends, and SBI, where activities are the means and standards are the ends (Harris & Carr, 1996).

The arrows inside the Learning Experiences triangle symbolize the different ways in which students need to be prepared in order to successfully complete the culminating task. For example, the authors of the “Pure Water Day” task presented in Mitchell et al. (1995) identify six areas in which students need learning opportunities (i.e., creating, administering, analyzing, and reporting a water-use survey; understanding the water cycle; writing a persuasive editorial) to meet the expectations. If students struggle in any one of these areas, then the teacher needs to reteach or make other adjustments. Otherwise the students are inadequately prepared for the culminating task. In SBI, students may need more time and/or different avenues to achieve desired levels of achievement: That is, SBI focuses on student achievement, not simply the coverage of material.

When planning learning experiences, there is a number of reflective questions teachers can ask themselves. What materials/resources will be needed? How long will students need to complete each activity? What prior knowledge will students need in order to complete the activities? What exemplars can be shared with students? What informal and formal assessments can be used to measure student progress? How can instruction be modified or differentiated to ensure that all students have the potential to reach or exceed the expected learning outcomes of this unit?

The arrow in Figure 2 that points up from the triangle to the rectangle signifies that all the learning experiences were geared to preparing the students for the demands of the culminating task, while the arrow that points up between the rectangle and oval shows that the successful completion of the culminating task is an indication that significant progress toward the standards has been achieved.

Standards-Based Units for ELLs

When planning for the achievement of ELLs in the SBI approach, there are some unique considerations that teachers need to make in each of the three steps of the backward mapping process. As for Step 1 in Figure 2, Identify Desired Results, it is important that teachers understand the standards they are required to target and commit their efforts toward them. ELLs must have access to challenging curricula and the focus of instruction should be on their long-term success. ELLs may experience academic difficulties due to their limited English proficiency or lack of content understanding due to limited formal schooling; nevertheless, ways in which teachers can help ELLs make reasonable progress toward high standards must be explored and pursued. The previously described approaches taken by the California Department of Education and TESOL are examples of how teachers, schools, and school districts make efforts to include ELLs in standards-based reform.

When considering Step 2 in Figure 2, Determine Acceptable Results, it is important to note that the assessment of ELLs is often problematic. Do the ELLs understand the directions for the task or prompt? Even if ELLs understand the directions, do they have the facility in English to show that they understand the knowledge, concepts, and skills that the unit has targeted? For example, if the performance task centers on the concept of photosynthesis, and the ELL understands the concept in his/her first language but cannot yet express it in English, what type of assessment that measures the ELL’s true content understanding and yields useful information for planning future English language instruction can be administered? Using alternative or authentic assessments with ELLs, rather than relying solely on traditional forms of testing such as multiple-choice tests, allows for better assess-
ment of the full range of student outcomes, and the information gained through the assessment can then be used to inform instructional planning. O’Malley and Pierce (1996) describe and discuss the advantages of using eight types of authentic assessments with ELLs, including oral interviews, story retellings, projects, and demonstrations, and they provide a number of rubrics and checklists appropriate for classroom use.

Perhaps the most important question in Step 3, Plan Learning Experiences and Instruction, is: How can instruction be modified or differentiated to ensure that all students have the potential to reach or exceed the expected learning outcomes of this unit? This question is particularly important when planning for the achievement of ELLs. To answer this question the teacher must identify the cognitive and language demands of the unit, as well as its cultural relevancy to the students. The diversity among ELLs is great; they differ according to prior educational experiences, exposure to English, length of time in the U.S., learning styles, family literacy practices, socio-economic status, sense of self, and other characteristics. These factors profoundly affect in idiosyncratic ways the learning readiness and rate of English acquisition of ELLs.

Examples of instructional accommodations or modifications which have proven effective with ELLs include providing instruction and materials in the students’ native languages; demonstrating activities and strategies through teacher “think alouds” and modeling; setting language, content, and learning strategy objectives; tapping prior knowledge; using visuals/manipulatives; explicitly teaching key vocabulary; adjusting speech; utilizing cooperative learning methods; and teaching coping strategies. Figure 3 below provides a brief rationale for these accommodations.

<table>
<thead>
<tr>
<th>Instructional Accommodations for ELLs</th>
<th>Rationale</th>
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<tbody>
<tr>
<td>Provide native language instruction and materials.</td>
<td>The strategic use of the students’ native language to focus on the development of higher order thinking skills and on the clarification and elaboration of key concepts and vocabulary has great potential for accelerating and enhancing ELLs’ access to mainstream curricula. Additionally, when ELLs’ native language is valued and utilized, they are more likely to have increased self-esteem and greater self-efficacy. Access to materials written in their native language supports ELLs’ literacy and cognitive development (Hakuta, 2001).</td>
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<tr>
<td>Provide “think alouds” and modeling.</td>
<td>ELLs benefit when teachers explain strategies and steps for tackling instructional tasks, check for student understanding before students start the task independently, and present numerous examples of concepts being taught (Gersten, Baker, &amp; Marks, 1998).</td>
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### Instructional Accommodations for ELLs

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<td>Set language, content, and learning-strategy objectives.</td>
<td>Chamot and O’Malley (1994) contend that content should be the primary focus of instruction, academic language skills can be developed as the need for them arises from the content, and ELLs can learn and apply learning strategies to a variety of contexts if those strategies are explicitly taught.</td>
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<td>Tap students’ prior knowledge.</td>
<td>Instruction that values and continues to cultivate the educational and personal experiences ELLs bring to the classroom, rather than ignores or tries to replace these experiences, enables students to make meaningful connections with what is being taught (Cummins, 1994).</td>
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<td>Use visuals/manipulatives.</td>
<td>Concrete examples and experiences give ELLs a variety of ways of understanding the information being presented.</td>
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<td>Teach key vocabulary.</td>
<td>Traditional instructional processes aimed at improving vocabulary acquisition in which students are given word lists to look up in the dictionary, followed by practice in a definition or synonym exercise, and then tested, do not work well with ELLs (O’Malley &amp; Pierce, 1996). Teachers need to utilize a variety of approaches and strategies (e.g., graphic organizers) to help ELLs gain a deep understanding of abstract concepts.</td>
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<tr>
<td>Adjust speech.</td>
<td>The Center for Applied Linguistics (1998) suggests 11 ways teachers can adjust their speech to increase comprehensibility: face the students; pause frequently; paraphrase often; clearly indicate the most important ideas and vocabulary through intonation or writing on the blackboard; avoid “asides”; avoid or clarify pronouns; use shorter sentences; use subject–verb–object word order; increase wait time for students to answer; focus on students’ meaning, not grammar; and avoid interpreting on a regular basis.</td>
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<tr>
<td>Instructional Accommodations for ELLs</td>
<td>Rationale</td>
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<td>Utilize cooperative learning methods.</td>
<td>Cooperative learning is a key instructional strategy for ELLs because it enhances interactions among students, promotes the development of positive academic and social support systems for ELLs, prepares students for increasingly interactive workplaces, and allows teachers to manage large classes of students with diverse needs (Holt, 1993).</td>
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<tr>
<td>Teach coping strategies.</td>
<td>ELLs may not have the confidence or facility in English to ask for help or clarification. They may also come from cultures where it is inappropriate to directly ask a teacher for help.</td>
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Bibliography


CISC/UCOP Mathematics Support Modules
Reflection / Assessment

Use one of your tangram shapes to compare to this shape.

How is it different?

How is it alike?

Use words you have learned to describe this shape. Use sentence builders to help.

“My shape has (more, less) _______________________ than the (trapezoid).”

“My shape is a _______________________ because it has _______________________, however, my shape is not a _______________________ because it does not have _______________________.

Extensions:

What strategies did you use to solve the problem?

What were good clues that made you think?

Which shape was the most difficult to describe? Why?