

Mathematics Content & Curriculum

The SIOP program is content and curriculum independent. Its aim is to simultaneously teach English language and content wherein there may be multiple interdisciplinary content goals, for instance, a thematic lesson may teach objectives from mathematics, language arts, music, science, and art. The techniques presented in SIOP are very adaptable to accommodate content from all grade levels and many curriculum styles.

Language Practices

The SIOP program maintains that language objectives of a lesson should be stated clearly, the same as with the content objectives, and these should be given both orally and in writing. It also stresses that in addition to vocabulary, grammar is an important component of language development. Since the SIOP program was developed specifically with ELL in mind, it addresses this section of the TSUS MELL CPF better than probably any of the other programs.

Family & Community Involvement

Certainly SIOP supports connections to each student's family-life through lessons that embed contextual experiences and skills, however, there does not seem to be much information about explicit interaction between the family and the student's learning. Neither does the program specifically advise teachers to engage in frequent communication about a student's progress. The collaborative approach of SIOP encourages pairing weaker students with stronger ones in terms of both language and content, but more exact information about pairing techniques are not explicitly mentioned.

Assessment of Student Learning

SIOP authors support teacher assessment strategies that offer multiple pathways for students to demonstrate their understanding of the content. The authors' claim that a variety of assessments allow teachers to create a more accurate appraisal of content knowledge and skill level. The appraisal is then used for instructional planning.

TEXTEAMS

Textteams, developed by the Dana Center in the mid-90s is a comprehensive system of professional development based on the mathematics and science Texas Essential Knowledge and Skills (TEKS). Professional Development is provided through a trained network of leaders who then provide training to pre-K to 12th grade teachers from that area on a more local level that is customized to meet the needs of a district or school.

Because the Textteam institutes were developed and designed using the Texas mathematics curricular framework, the alignment and assessment to the state curriculum and testing are in place. The length of the institutes that extend for 3-5 days can provide time for in-depth discussion of content and pedagogy matters. This also encourages collaboration and active participation among teachers at the institutes.

Learning Atmosphere & Physical Environment

Professional development experiences, much like the school mathematics and science curriculum itself, focus on a few activities in great depth. The professional development also provides opportunities for teachers to connect and apply what they have learned to their day-to-day teaching. The main focus is on addressing the content knowledge of teachers.

Instructional Practices

Textteams is designed to model pedagogy that deliberately engenders collaboration and active participation. Hands-on approach with “get-up-and move” activities is also modeled as a way to foster critical thinking through hands-on experiences. Questioning strategies are featured with variety of questions developed within each learning experience to elicit deep levels of mathematical or scientific understanding and proficiency for teachers.

Mathematics Content & Curriculum

The TEKS and TAKS objectives are the main objectives of the Textteams institutes and hence the curriculum and content are organized around the five main TEKS content strands: number and operation, patterns and algebraic thinking, geometry and spatial sense, measurement, and probability and statistics. Teachers engage in exploring and examining mathematical concepts in order to deepen their content understanding. The use of multiple representations, including verbal, concrete, pictorial, tabular, symbolic, and graphical, is encouraged.

Language Practices

There is not a mandate to provide materials for any specific group of students, therefore, the materials were not written in Spanish. Providers could present in Spanish, but there was no recommendation for this by Textteams. Multiple representations, concrete and visual models, and appropriate technology, are ways that various learning styles are accommodated.

Family & Community Involvement

Textteams does not address this aspect specifically in its professional development institutes.

Assessment of Student Learning

The main objective of the Textteams professional development is strengthening the teacher's content knowledge to more effectively teach the TEKS objectives to their students with results from the TAKS tests and the End-of-the-Year tests as the main assessment tools. The Algebra Institute, for example, examines assessments for alignment with TEKS and TAKS, focusing on methods for evaluating student work, developing strategies for classroom implementation, and making decisions based on student work. Strategies for fitting the Algebra II assessments into a district's yearly plan are also discussed. Some of the Textteams institutes' multiple tools for assessment are: "describing evidence of a student's understanding of content that was to be learned, and building questions and tasks to elicit evidence of understanding that can be recognized by both teachers and students."

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Appendix A –

MELL Classroom Practices Framework

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For The

Math for English Language Learners (MELL) Initiative

**A Texas State University System (TSUS) and
Texas Education Agency (TEA)
Collaborative**

Participating TSUS Institutions Include:

**Angelo State University
Lamar University
Sam Houston State University
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MELL Classroom Practices Framework

Introduction:

The MELL Classroom Practices Framework (CPF) is a synthesis document compiled by the Texas State University System (TSUS) Math for English Language Learners (MELL) Initiative and funded by a grant from the Texas Education Agency (TEA). In the summer of 2004, TEA, in response to the lingering achievement gap in mathematics between Limited English Proficient (LEP) students and other students, worked with TSUS and its five partner institutions to establish the MELL Initiative. The primary purpose of the MELL Initiative is to develop resources for professional development targeted at improving mathematics instruction for English Language Learners, especially those at the secondary level. MELL and TEA staff identified the need for a concise document that could not only capture the essence of the research but could also provide a roadmap for use in future resources. The MELL Classroom Practices Framework was developed in response to this need.

The MELL CPF was generated collaboratively by MELL and TEA staff and was guided by the question of “What do the findings of our research investigations suggest in regard to classroom practices that contribute to successful math instruction for English Language Learners.” This framework represents the collective thinking of the MELL partners about what the research investigations revealed and it is our intention that all of the MELL professional development products support teachers in implementing these classroom practices. Over time, as additional insights are gleaned from ongoing work, it is likely that this evolving framework will be revised.

Much, perhaps most, of this framework is comprised of elements of effective instruction that is appropriate for all students, and clearly all students would be well-served by these suggested practices regardless of their language proficiency. It appears, however, from our investigations, that the success of ELL students is more highly dependent on receiving instruction geared to their specific needs. In other words, while many students who are not experiencing a language barrier might be able to experience success with less than optimal instructional practices, few ELL students can thrive in such an environment. For this reason, creating a rich classroom experience for ELL students is not simply desirable, but rather is necessary if they are to have a chance to succeed. The MELL Classroom Practices Framework is targeted at achieving this goal.

1 Learning Atmosphere & Physical Environment

- 1.1 A caring classroom atmosphere of mutual respect and support is facilitated by the teacher who:
 - 1.1.1 Knows each child as an individual,
 - 1.1.2 Embraces languages, customs, and cultures of ELL students,
 - 1.1.3 Provides culturally rich learning materials,
 - 1.1.4 Encourages self-expression and provides positive recognition,
 - 1.1.5 Builds student confidence and esteem,
 - 1.1.6 Fosters an emotionally safe environment that allows students to feel secure and to take risks.
- 1.2 The classroom is visually rich to support student learning.
 - 1.2.1 Incorporates displays of student produced work, whenever possible,
 - 1.2.2 Is colorful and thought stimulating,
 - 1.2.3 Contains pertinent, real-world information and applications,
 - 1.2.4 Reinforces math-specific vocabulary and concepts,
 - 1.2.5 Provides color-coded learning supports when appropriate.
- 1.3 Room arrangement facilitates student interaction and group work.

2 Instructional Practices

- 2.1 Instructional practices foster cooperation and collaboration.
- 2.2 Concepts are presented accurately, logically, and in engaging ways.
- 2.3 Multiple representations incorporate mathematics learning levels: concrete, semi-concrete, and abstract.
- 2.4 The teacher employs student-centered instructional practices.
 - 2.4.1 Approaches content from a concept-oriented constructivist method,
 - 2.4.2 Surrounds students with different modalities (e.g., aural, visual, kinesthetic),
 - 2.4.3 Connects new concepts to prior learning,

- 2.4.4 Encourages students to refine and reflect about their own work and verbalize concept understanding “in their own words”,
 - 2.4.5 Chooses homework to optimize individual content development,
 - 2.4.6 Provides extra help and resources on an individual basis.
- 2.5 Students are frequently partnered with peer learners to enhance learning opportunities.
- 2.5.1 To develop math content,
 - 2.5.2 To aid English language development,
 - 2.5.3 To insure sustained active participation in the class,
 - 2.5.4 To welcome new students into an established learning community.
- 2.6 Instructional activities are varied and support diverse learning styles and multiple intelligences, including for instance:
- 2.6.1 Frequent use of models,
 - 2.6.2 Music as a motivator and anchor,
 - 2.6.3 Mind maps, poster-walks, and word walls
 - 2.6.4 Key vocabulary and cognates presented in different forms,
 - 2.6.5 Vivid adjectives.

3 Mathematics Content & Curriculum

- 3.1 Glossary of mathematical terms is always available for reference.
- 3.2 Content is aligned to appropriate grade-level, mathematics TEKS and professional standards.
- 3.3 Content is based on diagnosed student needs.
- 3.4 Content is systematically designed to incorporate sound learning principles.
 - 3.4.1 To incorporate increased complexity,
 - 3.4.2 To present a cohesive big-picture through chunking,
 - 3.4.3 To connect concepts through bridging and scaffolding,
 - 3.4.4 To emphasize multidisciplinary understandings,

3.4.5 To reflect on inherent patterns by comparing and contrasting concepts.

3.5 Curriculum is challenging, relevant, age-appropriate, and well-paced

3.5.1 To include contextually-based problems,

3.5.2 To incorporate student realities,

3.5.3 To involve interactive problem solving.

4 Language Practices

4.1 Language support is offered without supplanting English instruction.

4.2 Support is aligned with student’s diagnosed language needs.

4.3 Language used is appropriate to age and grade level and presented in a socially meaningful context.

4.4 Mathematics-specific vocabulary is explicitly and implicitly taught and reinforced through repetition.

4.5 Teachers are knowledgeable about the second language acquisition theories and best practices embodied in Texas Administrative Code, Title 19, Part II, Chapter 128.

4.6 Ideally, dual language instructional support should be offered.

4.7 When dual language teachers are not available, sheltered instruction should be utilized to provide strong language support by addressing content through ESL.

5 Family & Community Involvement

5.1 Schools connect to student’s family-life by embedding contextual experiences and skills in teaching and curriculum.

5.2 Projects are relevant and promote family interaction.

5.3 Opportunities are available for English-speaking higher grade-level students to mentor ELL lower grade-level students either in an in-school or after-school program, as appropriate.

5.4 Teacher engages in frequent communication with families

5.4.1 About activities and events in which parents can participate,

5.4.2 About student progress.

- 5.5 Teacher utilizes services provided by a community liaison and is knowledgeable about community resources.
- 5.6 Parents are informed about the benefits of using their most cognitively advanced language at home.

6 Assessment of Student Learning

- 6.1 Classroom assessment is designed to foster student success.
- 6.2 Assessment methods allow students frequent opportunities to demonstrate mastery in a variety of ways.
- 6.3 Various assessment techniques are used to measure student understandings.
- 6.4 Grades are oriented to promote and emphasize valid step-by-step logical reasoning processes.
- 6.5 Assessment data and results shape instructional planning.
- 6.6 Flexible time allotments are given to demonstrate concept mastery.

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