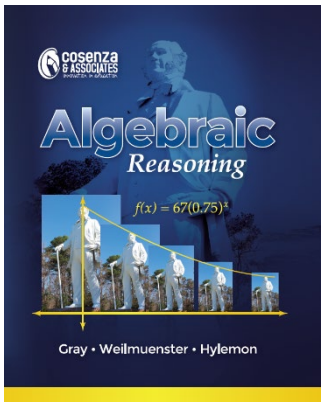
Cosenza & Associates, LLC Algebraic Reasoning



Cosenza & Associates, LLC, is a Texas-based company co-founded by a 7th generation Texan. Our Algebraic Reasoning course was written specifically for the TEKS – for Texas teachers by Texas teachers – rather than written for other standards and adapted for the TEKS. Because our leadership and writing teams have extensive experience teaching children in Texas public school classrooms, we keep teachers' ease of use at the front of our minds while developing instructional resources that anchor procedural fluency in conceptual understanding.

In this document, we highlight a few ways that our Algebraic Reasoning course addresses indicators of high quality instructional materials as identified by the Texas State Board of Education to provide a synopsis that supplements the quality report in which our instructional materials were recognized for 100% TEKS and ELPS alignment and fully meeting quality requirements for all six of the indicators in the rubric.

Intentional Instructional Design

We provide in-depth instructional support at the course, unit, and lesson levels to successfully bridge students from Algebra 1 to Algebra 2 through Algebraic Reasoning. Recognizing that a curriculum is more than simply a textbook, we have designed the online course to meet student needs by beginning with units associated with function types that are familiar from Algebra 1 first. Each unit contains a summary of what students will be expected to do and a letter in English or Spanish that can be sent home to families advising them of the content their students will experience and providing suggestions for how they can support their children in learning this content. We also emphasize both the learning outcomes for each lesson topic and how students will use the process standards to acquire and demonstrate their knowledge and skills.

Each lesson provides extensive support for teachers to better understand the key elements of the topic and how it relates to students' prior knowledge and future learning. Suggestions for supporting all learners, including multilingual learners and students with special needs, are tailored to support the topic in the lesson. We provide detailed tips and instructions for each phase of the 5E lesson: Engage, Explore, Explain, Elaborate and Evaluate (Bybee et al., 2006; Omotayo & Adeleke, 2017), as well as potential timing guidelines for the course, each unit, individual lessons and lesson phases. We leverage high yield instructional strategies in our lessons, such as the frequent use of visibly randomized groups (Liljedahl, 2021), open questions and parallel tasks (Small & Lin, 2010).

Progress Monitoring

Teachers must be able to monitor students' progress as they move through the year and students should learn how to monitor their own progress. Our Evaluate tasks at the end of each lesson provide a terrific opportunity for teachers to engage in formative assessment to determine what their students learned about the mathematics they were just taught. We also provide summative assessments at the middle and end of each unit. These questions could be used as-is or the teacher could use our online test database to edit and customize these questions to meet their students' unique learning needs. Important topics and function types are encountered several times during the course, allowing students multiple opportunities to demonstrate mastery and providing teachers with ample opportunities to ensure that all students succeed. Review lessons that consolidate the learning in several lessons within a unit are also included prior to summative assessments.

We additionally offer ready-made tools for teachers to provide just-in-time scaffolding to address any learning gaps that may exist for students enrolled in Algebraic Reasoning alongside course-level content (NCTM, NCSM, & ASSM, 2021). Our TEKS Companion Guide resource has been designed to support students in meeting all state assessment graduation requirements. This strong support for both reasoning and skills leveraged by teachers right at the point at which it is needed for a student to access course-level content is critical.

Supports for All Learners

We provide a variety of differentiation strategies and scaffolds to support student success. The Elaborate activities are differentiated for students who are *not yet proficient*, *somewhat proficient*, *proficient*, and *highly proficient*. Based on students' performance in the Engage, Explore, and Explain phases of the lesson, the teacher may select which problems to assign the student to complete in the Elaborate phase.

Vocabulary and language acquisition is important for all learners, particularly multilingual learners. In addition to the six-step language acquisition process (Marzano & Pickering, 2005) highlighted in the Teacher Guide, each lesson provides a list of key vocabulary terms. Where needed, additional language acquisition strategies such as sentence stems and sentence frames are included (Seidlitz & Kenfield, 2013).

We also provide explicit instructional support for multilingual learners or emergent bilingual (EB) students. Each lesson is anchored in both TEKS and ELPS for mathematics and specific instructional strategies that support language acquisition. Guidance for teachers to provide linguistic accommodation in accordance with a student's language proficiency level is listed generally in the Teacher Guide, and in a lesson those suggestions are directly tied to the content of that lesson.

Depth and Coherence of Key Concepts

We strongly believe in a concrete-representational-abstract approach to learning mathematics. Beginning with a concrete or pictorial presentation of a topic gives students a way to anchor their learning. Connecting to a representation such as a graph or a table provides a visual illustration of the concept from which students may extend the idea into an abstract or symbolic representation. In short, when students have a kinesthetic or visual understanding of mathematics, then procedures make more sense and become less mysterious.

Our practice opportunities begin at a skills-based level and proceed into real-life problem situations aligned with the TEKS. Questions progress in rigor and complexity so that by the end of the lesson or series of lessons, students can acquire grade-level proficiency.

Balance of Conceptual and Procedural Understanding

Balanced instruction is important. At times, the teacher will choose to use an inquiry-based method of instruction as students explore and internalize new concepts. At other times, the teacher will choose a more direct instructional approach, particularly when teaching skills. In the Explain phase, teachers are provided with guidance on using both an inquiry-based approach or explicit instructional approach so that they may make choices that benefit their students.

Our lessons anchor skills in concepts. We use visual models such as graphs and tables to represent key ideas and concepts. We use manipulatives such as color tiles to show students how functions work and why they work like they do. We use these models to anchor generalized procedures and standardized algorithms so that students understand why these procedures make sense.

Procedural fluency is essential to understanding and fully using mathematics in meaningful ways. We build fluency by addressing operations and algebraic skills in a sustained approach over time. Stepped-out examples provided in each lesson show students a sequence of procedures that are necessary to solve meaningful problems.

Texas provides teachers with a critical tool to make mathematics more meaningful to every child: the mathematical process standards found in the TEKS. Each lesson addresses a content TEKS/SE, an ELPS standard, and a process TEKS/SE. During any lesson, students will likely use more than one mathematical process (e.g. multiple representations, communicating reasoning, applying mathematics to real-world problems, etc.). In our course, we identify a showcase process standard that naturally blends with the content standard(s) the topic requires.

Productive Struggle

Students need time to wrestle with the ideas they encounter in a mathematics lesson. Learning that sticks occurs when students encounter a situation that isn't familiar to them but is close enough to something they already know. The Engage phase of each lesson is grounded in real-world experiences that are familiar to students. The Explore phase guides students through inquiry during which they grapple with new learning. In the Explain phase of each lesson, students encounter *You Try It!* problems where they are asked to solve a problem very similar to an exemplar. Students spend the Elaborate phase of the lesson solidifying their understanding and skills so that they will be successfully able to showcase their new understanding in the Evaluate task at the lesson's conclusion. In this way, students check their own understanding and the teacher gains insights into what sense students are making of the mathematical topic at hand.

Students also have multiple opportunities to communicate their mathematical thinking, including speaking and writing about their understanding during Explore inquiries and Evaluate tasks in addition to using multiple representations to convey mathematical ideas. Unit Enrichment and Extension activities provide beautiful opportunities for students to engage in deeper levels of problem solving as they combine several mathematical ideas and skills, often to solve a meaningful real-world problem. Students are required to show their thinking as they explain why they did what they did and what mathematical ideas justify their actions.

References

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