Introduction to the Program

Introduction

The *TEKS Mathematical Models with Applications Program* is a complete set of materials developed to be aligned to the Texas Essential Knowledge and Skills (TEKS) and the Mathematical Models with Applications content map. Topics are built around accessible core curricula, ensuring that the *TEKS Mathematical Models with Applications Program* is useful for college-ready students and diverse classrooms.

This program realizes the benefits of exploratory and investigative learning and employs a variety of instructional models to meet the learning needs of students with a range of abilities.

The *TEKS Mathematical Models with Applications Program* includes components that support problem-based learning, instruct and coach as needed, provide practice, and assess students' skills. Instructional tools and strategies are embedded throughout.

The program includes:

- More than 165 hours of lessons
- Essential Questions for each instructional topic
- Vocabulary
- Instruction and Guided Practice
- Sets of standards-based Scaffolded Practice and Practice problems
- Problem-based Tasks and Coaching questions
- Step-by-step graphing calculator instructions for the TI-Nspire and the TI-83/84
- Performance Tasks to promote collaborative learning and problem-solving skills
- Aligned open education resources that enhance procedural fluency and conceptual understanding
- Embedded Instructional Strategies to enable access for all students

Purpose of Materials

The *TEKS Mathematical Models with Applications Program* has been organized to coordinate with the TEKS Mathematical Models with Applications content map and specifications from the Texas Essential Knowledge and Skills.

Each topic includes activities that offer opportunities for exploration and investigation. These activities incorporate concept and skill development and guided practice, then move on to the application of new skills and concepts in problem-solving situations. Throughout the lessons and

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activities, problems are contextualized to enhance rigor and relevance.

This program includes all the topics addressed in the TEKS Mathematical Models with Applications content map. These include:

- Data Collection and Analysis
- Mathematical Models in Research
- Mathematical Models in Science and Engineering
- Probability
- Personal Finance: Income, Taxes, and Budgeting
- Personal Finance: Savings and Investment
- Personal Finance: Credit, Loans, and Insurance
- Mathematical Models in Architecture and Spatial Reasoning
- Mathematical Models in the Fine Arts

The Mathematical Process Standards described in the Texas Essential Knowledge and Skills are infused throughout. The student is expected to:

- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;
- (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
- (E) create and use representations to organize, record, and communicate mathematical ideas;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and
- (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

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Structure of the Teacher Resource

The *TEKS Mathematical Models with Applications Teacher Resource* materials are completely reproducible. The Program Overview is the first section. This section helps you to navigate the materials, offers a collection of research-based Instructional Strategies along with their literacy connections and implementation suggestions, and shows the correlation between the Texas Essential Knowledge and Skills and the Mathematical Models with Applications content map and course requirements.

The remaining materials focus on building math content knowledge and conceptual understanding through application of the units in the *Mathematical Models with Applications* program: Data Collection and Analysis; Mathematical Models in Research; Mathematical Models in Science and Engineering; Probability; Personal Finance: Income, Taxes, and Budgeting; Personal Finance: Savings and Investment; Personal Finance: Credit, Loans, and Insurance; Mathematical Models in Architecture and Spatial Reasoning; and Mathematical Models in the Fine Arts. The units in the *TEKS Mathematical Models with Applications Program* are designed to be flexible so that you can mix and match activities as the needs of your students and your instructional style dictate.

The Performance Tasks correspond to the content in selected units and provide students with the opportunity to apply concepts and skills, while you have a chance to circulate, observe, speak to individuals and small groups, and informally assess and plan.

Each unit includes a pre-assessment and unit assessment, and each topic ends with a progress assessment. These allow you to assess students' progress as you move from topic to topic, enabling you to gauge how well students have understood the material and to differentiate as appropriate.

Glossary

The Glossary contains vocabulary terms and formulas from throughout the program, organized alphabetically by units. Each listing provides the term and the definition in both English and Spanish.

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