TRANSITION TO COLLEGE MATHEMATICS AND STATISTICS

Preparing Fourth-Year High School Math Students for College, Career, and Real-World Success

Program Overview
Transition to College Mathematics and Statistics

A Fourth Year Mathematics Course

Transition to College Mathematics and Statistics (TCMS) is a fourth-year capstone mathematics course designed for students entering the workforce or pursuing non-STEM college degree programs upon graduation. The TCMS program provides a student-centered curriculum that focuses on real-world problems, encourages active engagement, and fosters problem solving skills—providing a solid foundation for success in college, career, and daily life.

Developed with funding from the National Science Foundation (NSF), the TCMS curriculum focuses on four major branches of mathematical science and is intended to target the core competencies required for career readiness and college placement tests.
TCMS curriculum is available in print, digital, and blended formats to meet your instructional needs today, tomorrow, and beyond.
**Problem-Based Learning**

The *TCMS* program is a perfect fit. Student-oriented, problem-based learning will engage her students — reinforcing and building the math skills they need to perform well on college placement tests. The four-phase instructional cycle will guide her students through the learning process to build their conceptual understanding of mathematics, positioning them for college success.
Active Learning for Today’s World

Incorporating hands-on, group collaboration, the TCMS curriculum encourages students to become responsible and highly engaged in their learning while developing 21st century skills needed for college and careers.

Explore the Four-Phase Instructional Cycle

The TCMS program is designed around an instructional model informed by theory and research on teaching and learning. Units support sense-making and reasoning in mathematics through a four-phased instructional cycle. This method of instruction engages students in a way that encourages analysis, abstraction, and a deeper understanding of mathematical ideas and their application in real life.

1. **Launch**  Think About This Situation
   An introductory problem situation sets the context for class investigations to follow and provides important information on students’ prior knowledge.

2. **Explore**  Group Investigation
   Student teams investigate and reason through problem situations posed by the launch scenario.

3. **Share & Summarize**  Summarize the Mathematics
   Teacher-led discussion to guide student groups as they summarize their mathematical ideas and construct a shared understanding of concepts, methods, and supporting justifications.

4. **Self-Assess**  Check Your Understanding, Homework
   A Check Your Understanding task and assigned homework tasks provide important formative assessment for students and their teachers.
Marin is a high school senior. She needs a fourth year of math to be accepted into the college elementary teacher program of her choice, but Precalculus and AP Statistics intimidate her. Is there an alternative?

Modern & Relevant Curriculum

A TCMS course is Marin’s best choice, presenting real-world, relatable mathematics situations that will allow her to work through solutions in a manner that is modern and relevant. She’ll fulfill her four-year math requirement and deepen her mastery of mathematical concepts with a course grounded in mathematical modeling and supported by technology that enhances her learning experience.
Emphasis on Mathematical Modeling

The design of the TCMS curriculum engages students in the mathematical modeling process and encourages the development of mathematical behaviors emphasized in the CCSS Standards of Mathematical Practice. Student interest is cultivated with:

- Relatable, real-world problems and situations
- A collaborative, problem-solving model
- Instruction that fosters the connection of mathematical concepts

Integrated with Technology

The TCMS curriculum is designed to take advantage of the power and potential of technology to support students as well as teachers. Content is available in online and mobile formats and is paired with digital resources including McGraw-Hill eAssessment and TCMS-Tools® software. These technological resources:

- Support and enhance the learning and instructional process.
- Develop mathematical thinking and problem-solving.
Tad is a senior who’s completed his math requirements for graduation. He has his sights set on pursuing Political Science in college and thinks a fourth year of math isn’t important. Should he reconsider his decision?

College & Career Preparation

The TCMS program is for students like Tad who are either pursuing non-STEM degrees or entering career-training programs. It develops group collaboration, communication, and justification skills that are vital for his college and career preparation. Although Tad plans to study Political Science, he’ll need to qualify for a credit bearing college mathematics course. The TCMS program will prepare Tad for a strong performance on the college mathematics placement test.
Target Core Competencies

The TCMS program prepares students for college success by further developing and solidifying concepts students developed in previous mathematics courses (Number and Quantity, Algebra, Functions, and Geometry). The incorporation of College Readiness Assessment (CRA) tasks within the TCMS program builds skills in the core competencies assessed on many college placement tests—providing valuable practice and guidance on successful test-taking strategies.

Mathematics in Context

The TCMS program helps students develop a deep understanding of mathematical practices and provides opportunities to apply advanced mathematics in a wide range of contexts. Lessons help students make connections between mathematical concepts and real world challenges, sharpening their problem solving and everyday mathematics reasoning skills for college and the workplace. The TCMS program features eight units of mathematical topics to challenge and interest students.
## Table of Contents

**UNIT 1** Interpreting Categorical Data  
Develops student understanding of two-way frequency tables, conditional probability and independence, and the use of data from a randomized experiment to compare two treatments.

**UNIT 2** Functions Modeling Change  
Extends student understanding of linear, exponential, quadratic, power, circular, and logarithmic functions to model quantitative relationships and data patterns with graphs that are transformations of basic patterns.

**UNIT 3** Counting Methods  
Extends student ability to count systematically and solve enumeration problems using permutations and combinations.

**UNIT 4** Mathematics of Financial Decision-Making  
Teaches students financial concepts using functions, expressions, and equations that are presented in linear, exponential, and logarithmic formats that represent the mathematical relationships in financial models.
UNIT 5  Binomial Distributions and Statistical Inference
Develops student understanding of the rules of probability; binomial distributions; expected value; testing a model; simulation; making inferences about the population based on a random sample; margin of error; and comparison of sample surveys, experiments, and observational studies and how randomization relates to each.

UNIT 6  Informatics
Develops student understanding of the mathematical concepts and methods related to information processing, particularly on the Internet, by focusing on the key issues of access, security, accuracy, and efficiency.

UNIT 7  Spatial Visualization and Representations
Extends student ability to visualize and represent three-dimensional shapes using contour diagrams, cross sections, and relief maps. Presents coordinate methods for representing and analyzing three-dimensional shapes and their properties. Uses graphical and algebraic reasoning to solve systems of linear equations, inequalities in three variables, and linear programming problems.

UNIT 8  Mathematics of Democratic Decision-Making
Develops student understanding of the mathematical concepts and methods that are used to make decisions regarding voting and fair division in a democratic society.

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