

CSU/UC Mathematics Diagnostic Testing Project (MDTP) is grant funded to support CA secondary math teachers free of charge



## *Use MDTP to Inform and Implement an Equitable Course-enrollment Policy*

CSU/UC Mathematics Diagnostic Testing Project

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# In this discussion, we will:

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PROVIDE AN  
OVERVIEW OF SB-359  
AND ITS RATIONALE  
REGARDING EQUITY



DESCRIBE HOW TO  
USE MDTP  
ASSESSMENTS TO  
ASSIST STUDENTS  
AND TO COMPLY  
WITH SB-359

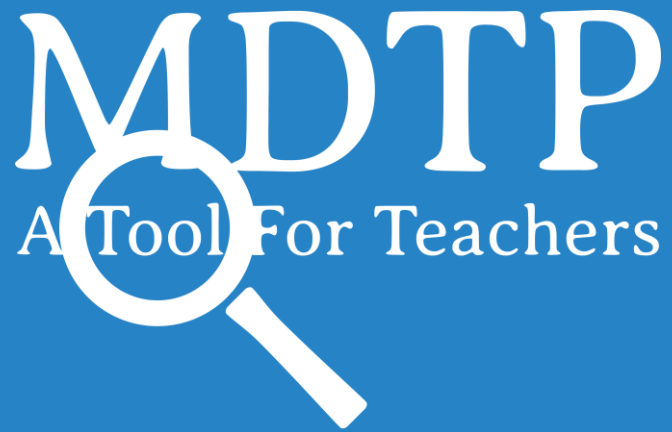


PROVIDE  
RECOMMENDATIONS  
FOR INFORMING  
COURSE ENROLLMENT  
OPTIONS BEING  
ATTENTIVE TO  
EQUITABLE PRACTICES



PROVIDE BASIC  
INFORMATION ON  
SOME STATISTICAL  
ISSUES AROUND  
SETTING CUT  
SCORES

# Responding to the California Mathematics Placement Act of 2015 (SB-359)



All educational bodies with students entering the 9<sup>th</sup> grade must enact “**a fair, objective, and transparent mathematics placement policy**” (SB-359, 2015) to include:

- A systemic practice using multiple objective academic measures: “statewide mathematics assessments, including interim and summative assessments authorized pursuant to Section 60640, **placement tests** that are aligned to state-adopted content standards in mathematics, classroom assignments and grades, and report cards” (SB-359, 2015)
- At least one placement checkpoint during the first month of school

# Rationale for SB-359

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- Student preparation and achievement in math is paramount to success in college and career, especially in STEM fields
- Student success hinges on appropriate math course enrollment during middle and high school years
- 9th grade math course is “a crucial crossroads” for future educational success (SB-359, 2015)
- Enrollment in an inadequate course results in students who are less competitive for college admissions and happens disproportionately more with successful students of color

# Informing Course Options vs. Readiness

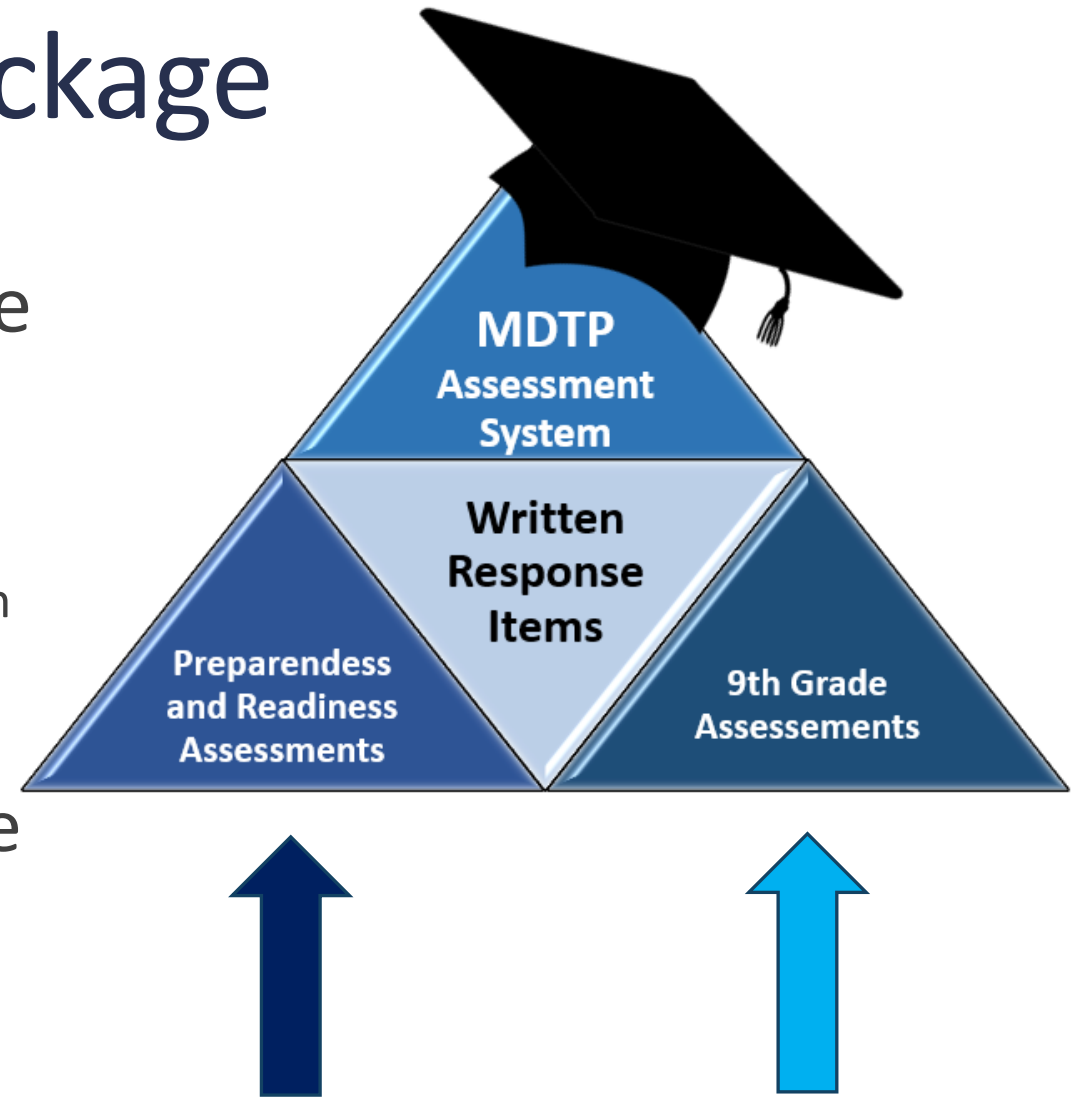
- Objective of the assessment
- Content of the assessment
- Consequences in the outcome of the assessment

	Test	Objective	Content	Outcome
<b>Informing Course Options</b>	Summative	To learn if students can succeed in the next level of math	Majority from prior math course	High stakes
<b>Readiness Assessment</b>	Formative	To learn about student understanding, pedagogical practices, and program enhancement	Foundational math concepts and skills	Low stakes

# 9<sup>th</sup> Grade Assessment Package

MDTP tests provide a quality package for informing course options in 9<sup>th</sup> grade

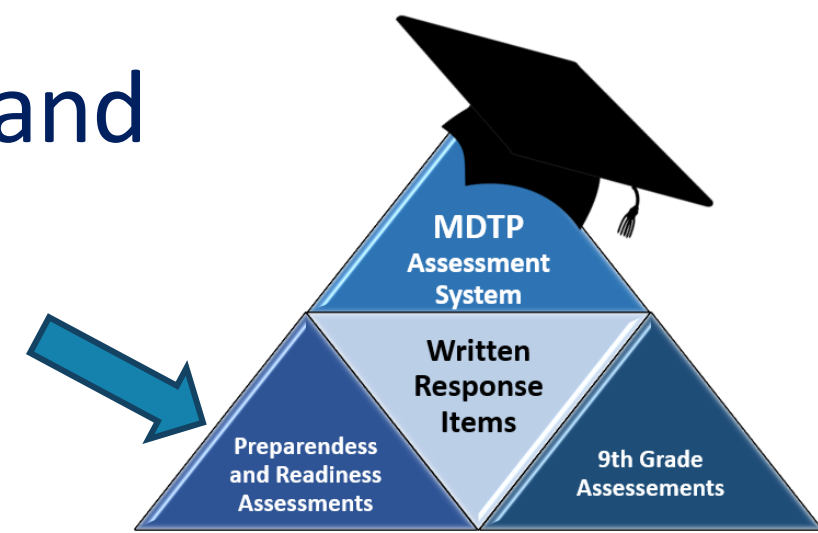
- 9<sup>th</sup> grade assessments in spring of 8<sup>th</sup> grade
- Readiness tests in the fall of 9<sup>th</sup> grade



# MDTP Assessments of Preparedness and MDTP Readiness Tests

<https://mdtp.ucsd.edu/assessments/readiness-tests.html>

Tests range from Grade 6 Math through Calculus

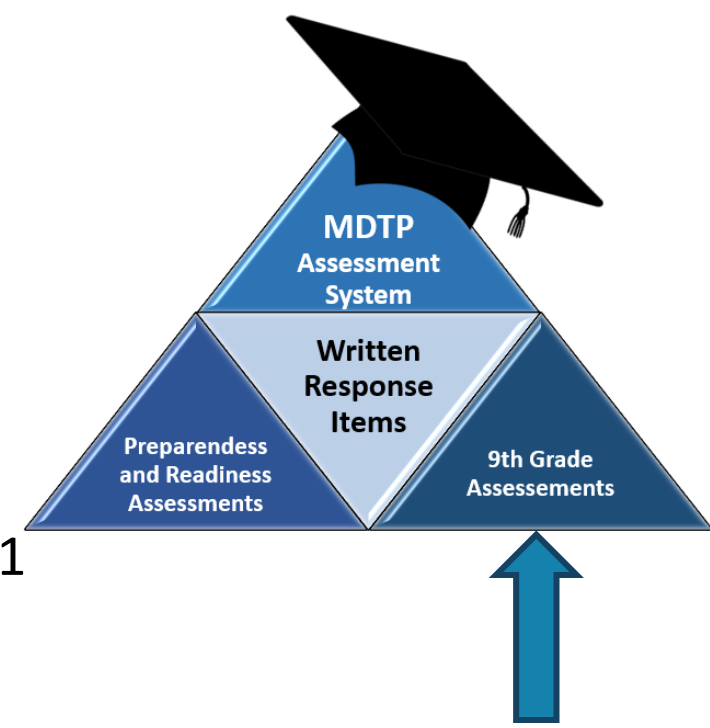


- ❖ Measure students' preparation and readiness for the course they are entering or the next course
- ❖ Help teachers understand their students' mathematical **competency** in **important topics** along the **progressions** toward college mathematics
- ❖ Provide diagnostic feedback to **inform the design of instructional actions** to remedy **misconceptions** and **close gaps**
- ❖ Can be administered anytime throughout the year

# MDTP 9<sup>th</sup> Grade Assessments

<https://mdtp.ucsd.edu/assessments/9th-grade-assessment-tests.html>

- **9<sup>th</sup> Grade Assessment:** Students exiting Grade 8 Math
- **Geometry Assessment:** Students exiting Algebra 1
- **Integrated Second Year Assessment:** Students exiting Integrated Math 1



- ❖ Support SB-359 mandate
- ❖ Designed to be used as one of multiple measures to **inform options** for course enrollment towards college preparedness.
- ❖ Provide diagnostic feedback that can be used to **inform program reflection and design**.
- ❖ **Online testing only**



# MDTP Tests and Suggested Use (9<sup>th</sup> Grade)

## Administration of MDTP 9<sup>th</sup> Grade Assessment Package

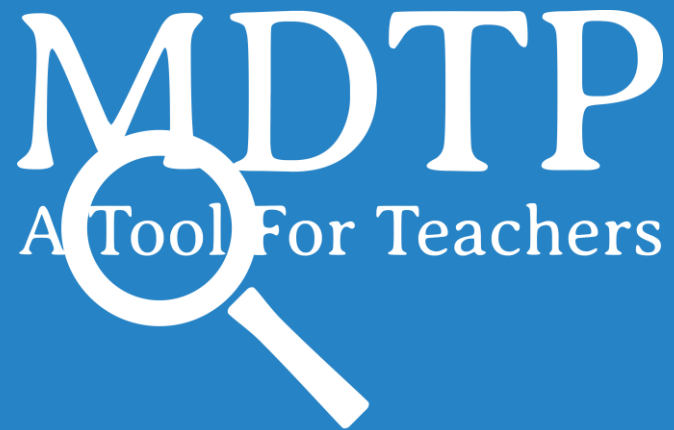
8 <sup>th</sup> Grade Math Course	Exiting 8 <sup>th</sup> Grade (before 9 <sup>th</sup> Grade Math Course)	First Month of 9 <sup>th</sup> Grade Math Course
<i>Grade 8 CC Math</i>	9 <sup>th</sup> Grade Assessment (9A40D19)	Algebra 1/Integrated Math 1 Readiness Test (AMR45A19)
<i>Algebra I</i>	Geometry Assessment (GA40D19)	Geometry Readiness Test (GR45A19)
<i>Integrated Math 1</i>	Integrated Second Year Assessment (ISA40D19)	Integrated Second Year Readiness Test (ISR45A20)

Inform Course Options  
One of Multiple Measures

Check Placement

Evaluate Current Readiness

# Recommendations for Informing Next-Course Enrollment



- Adhere to Criterion #1 of SB-359 – **“a fair, objective, and transparent mathematics placement policy”**
  - One of multiple measures
  - Objective criteria applied systematically for all students
- Use **“MDTP’s Six Guidelines to Inform Next-Course Enrollment Options”** to inform the design of an equitable policy

# Guideline #1

## Use Multiple Measures

- Avoid using cut-scores as the primary criterion for placement
- Example from one school district: “Multiple Filters”
  - Student achievement: course grade, end-of-course exam scores, and MDTP
  - Student effort and work habits: homework, attendance, and citizenship
  - Teacher recommendation

## Guideline #2

### **Consider recommendations based on total score and topic scores**

For example:

- Answer a predetermined minimum number of questions that need to be correctly answered OR
- Answer a predetermined number of questions per selected relevant topics OR
- Create a metric to include both minimum score and/or minimum topic responses

## Guideline #3

### **Provide students with diagnostic feedback about their preparation for a course**

- Diagnostic feedback to the student is an important part of any process to inform course enrollment options
- Diagnostic feedback allows opportunities to advocate for remediation prior to enrollment

## Guideline #4

**Create supports and options for students close to cut-scores such as corequisite coursework or data-focused tutoring**

- Support programs can allow districts to set lower cut scores and enroll more students into an appropriate course
  - Allow students who are at the high end of a qualifying score to enroll in the higher course
  - Support students who are at the low range of a qualifying score

## Guideline #5

### Use local experts to determine cut scores or score ranges

- Teachers and content experts familiar with the course content should determine the initial cut scores or score ranges
- Consult the ETS publication: *A Primer on Setting Cut Scores on Tests of Educational Achievement* (Zieky & Perie, 2006) for guidance on setting cut scores

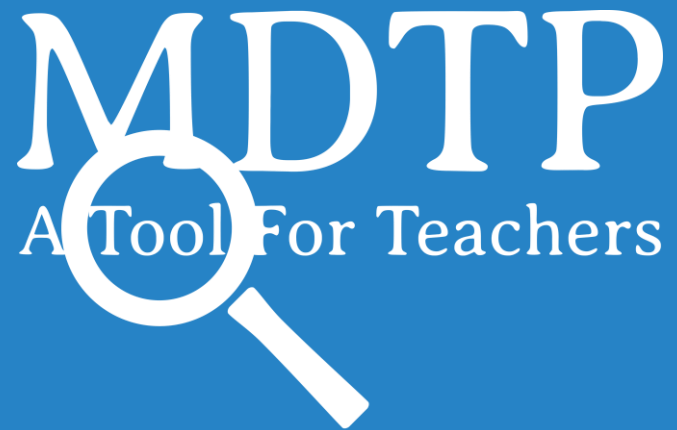
# Guideline #6

## Evaluate how well the course enrollment program is working and adjust as needed

- Analyze the relationship between enrollment decisions and subsequent course performance
- Annual analyses of the measures used should be conducted at each school and for each course
- Adjustments to the course enrollment policy should be made as indicated by data analysis



# Statistical Issues to Inform an Equitable Policy



- Understand the implications of cut-scores to enact a fair and equitable course-enrollment policy



# Observed Score vs. True Score

- The observed score is the score the student earns on a test or a on specific measure.
- The true score is the expected value of the score if the student could take the test many times.
- We can think of the observed score as the sum of the true score and a random error.

# False Negatives and False Positives

- There are two types of errors that arise when cut scores are used to classify students (to enroll students in a certain course or to not).
- A false negative occurs when the observed score is below the cut score, but the true score is at or above the cut score.
- A false positive occurs when the observed score is at or higher than the cut score, but the true score is lower than the cut score.

# Expected Errors

- Errors occur when using cut scores
  - No test can be perfectly reliable or valid
  - No method of setting cut scores is perfect
  - Scores themselves have some randomness
- Errors are more likely to occur when classifying students who score near the cut score

# Anticipate and Plan for Potential Errors

- Determine your policy around the relative harm of false negatives vs. false positives.
- Adjusting the cut score up or down to reduce one type of error will increase the chances of making the other.
  - If you want to reduce false negatives, consider lowering the cut score.
  - If you want to reduce false positives, consider raising the cut score.
- Always **use multiple measures**, especially for students whose score is near the cut score.

# MDTP: A Valuable Contribution to Course Enrollment Decisions

(Huang, C.-W., Snipes, J., & Finkelstein, N. (2014). *Using assessment data to guide math course placement of California middle school students.*

- MDTP clearly identifies a set of measurable skills that predict algebra 1 proficiency.
- “Students who achieve mastery in five or more MDTP Topics have a 75% chance of achieving proficiency in algebra 1” (p.i). [Using the Grade 7 Readiness Test]
- “Practitioners may want to consider using MDTP results to aid in high school math placement decisions and to identify areas for focused support aimed at helping students succeed” (p.ii).

# The Importance of Getting it Right

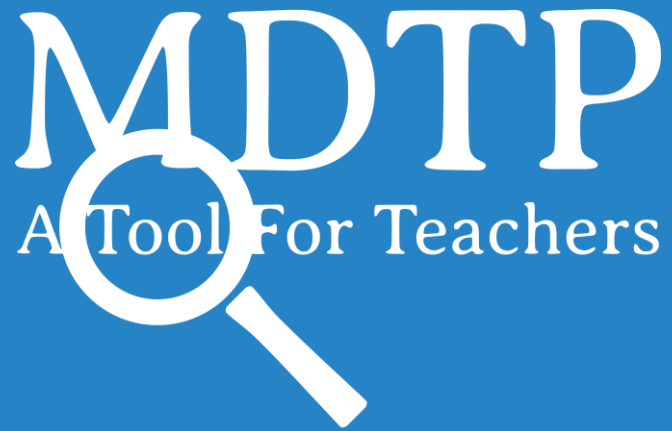
- Students with **weakness in foundational topics of algebra readiness are most greatly affected by misplacement** and experience difficulty in reaching proficiency in subsequent coursework (Finkelstein et al., 2012).
- “Correct math placement must be free of all socio-demographic bias—select the right course at the right time for students and reevaluate students’ progress often” (Fong & Finkelstein, 2014, p.5).

# References

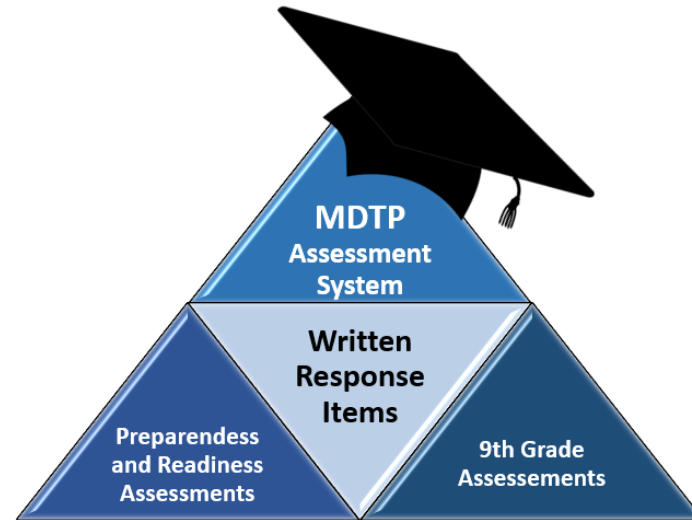
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# Questions



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# Thank you!