Data-Driven Math Acceleration:

Improving Outcomes Through PAUSD's Standards-Aligned Math Validation Process

CERA Conference
November 2025

PALO ALTO
UNIFIED SCHOOL DISTRICT

WestEd

Welcome!

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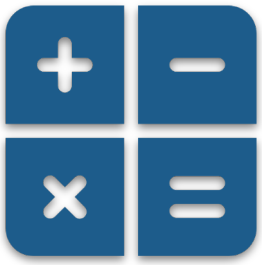
Today's Learning Objectives



Objective 1

Understand the structure and impact of PAUSD's Math Validation Process.

Objective 2

Examine the collaborative process between district leaders & WestEd in developing a reliable, valid, and standards-aligned assessment system.

Objective 3

Analyze implementation strategies that foster transparency, fairness, and academic excellence in placement.

Objective 4

Develop actionable plans to design or refine placement processes aligned with district needs.

Key Takeaways

Strong Partnerships Produce Strong Systems

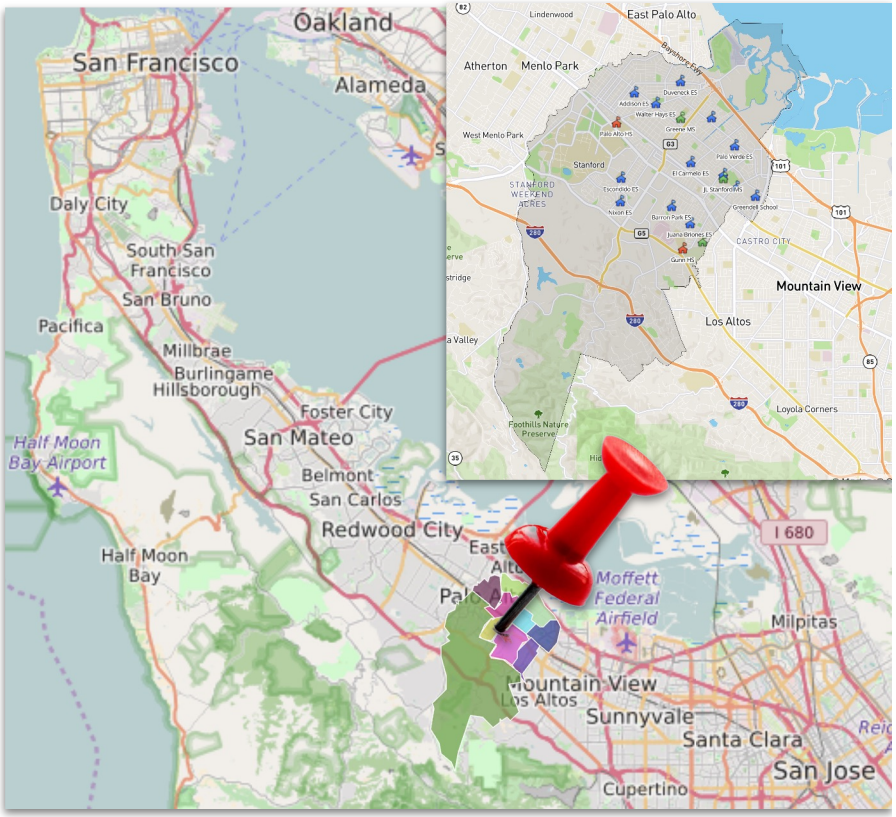
Transparency Builds Trust

Psychometric Rigor Ensures Equity

Assessment Can Expand Opportunity

Palo Alto Unified: About Us

- PK–12 & Adult School
- ~10,000 students
- 20 physical locations (3 middle schools)
- Strong STEM culture and high expectations
- Home of Stanford University & *Silicon Valley*

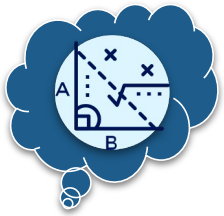


The PAUSD Promise

The Promise reflects our ongoing commitment to excellence, innovation, and belonging—anchored by the belief that every child deserves to learn, grow, and thrive in an environment that values their unique potential.

Considering Context

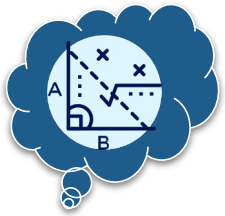
2019–20



Dec 10, 2019: Reimagining Math Plan presented to the PAUSD Board

Begin shift in PD & instructional focus

2020–21 to 2022–23



Reimagining Math phased in one grade level per year

Continue shift in PD & instructional focus

2023–24

PAUSD / WestEd Partnership begins

Research Brief published: Summer 2024

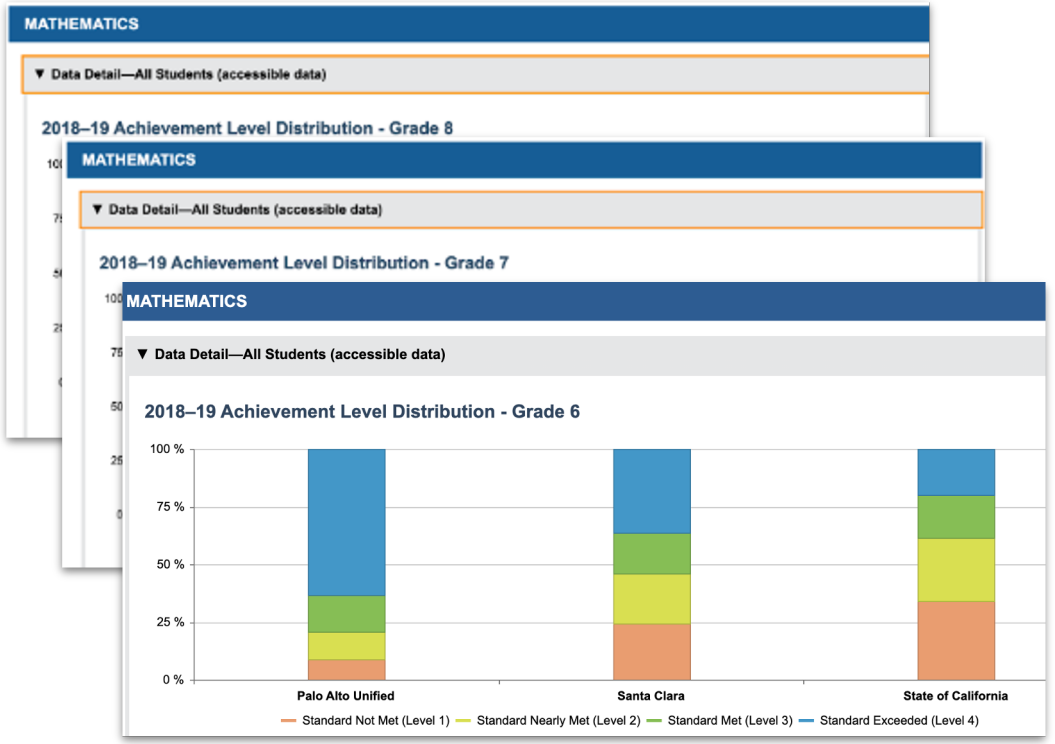
2024–25 to 2025–26

Years 2 & 3 PAUSD / WestEd Validation Process

Research Brief updated: May 2025

Why Reimagine Middle School Math in 2019?

- Advance equity
- Streamline content to better serve the large “middle band” of students
- Strengthen learning for all students
- Ensure the vast majority enter high school ready for Geometry
- Continue to provide opportunities to accelerate for students who are ready



Three Years of Math

California Common Core State Standards (CCSS)

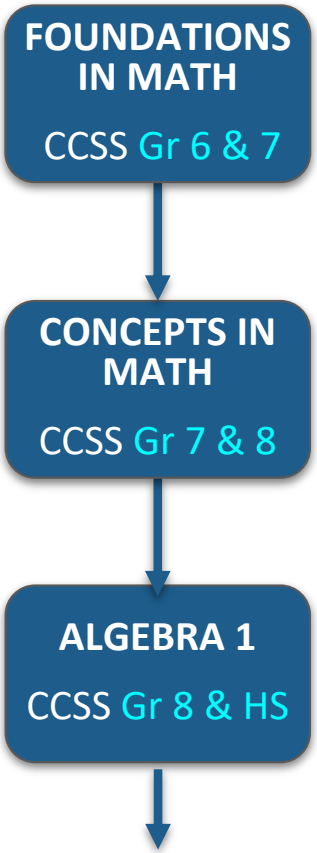
CCSS
grades 6, 7, 8

In grade 9, opportunity to enroll in Algebra 1

PAUSD Math Standard Pathway

CCSS grades 6, 7, 8, and Algebra 1

FOUR Years of Math in Three Years

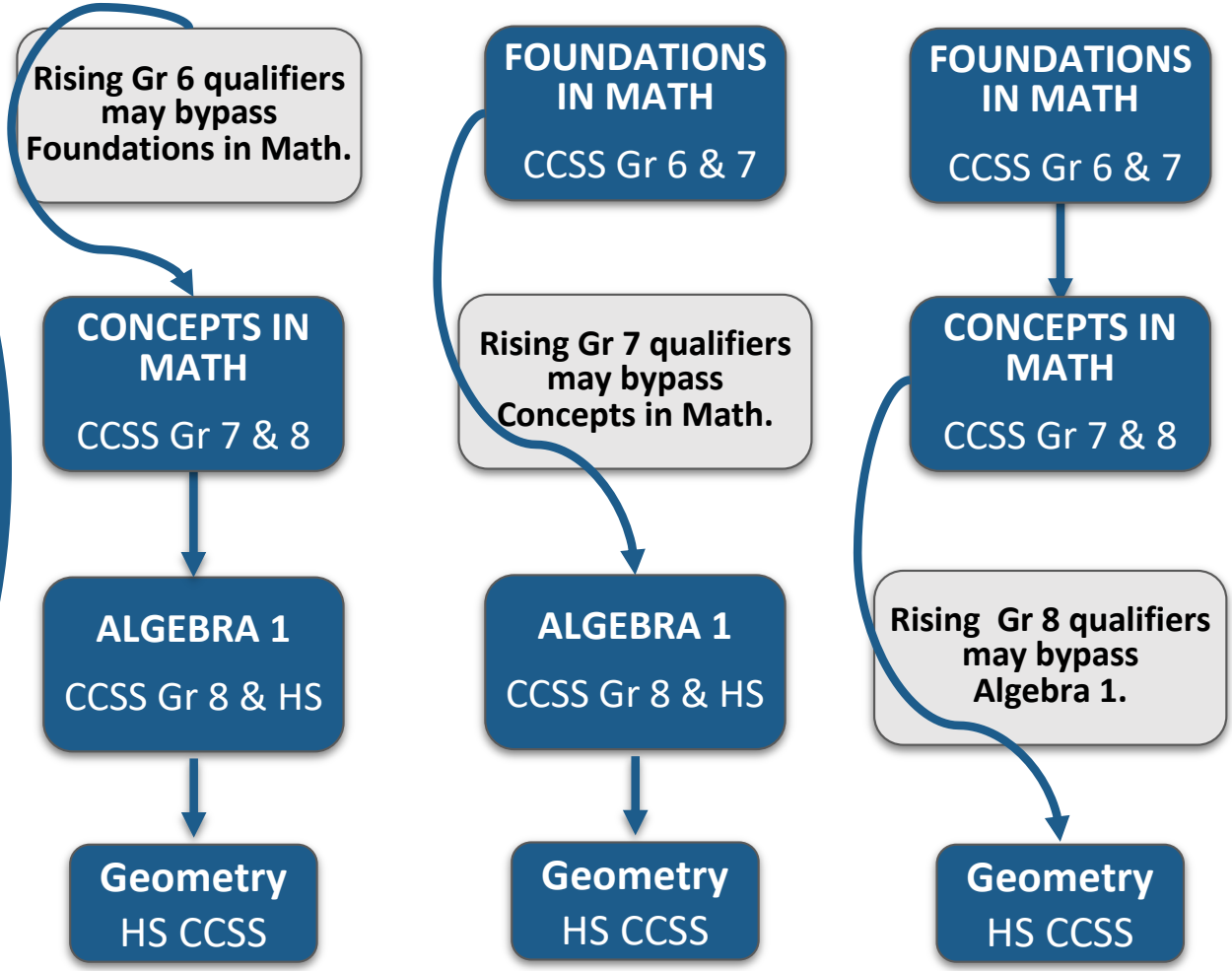


In Grade 9, opportunity to enroll in Geometry or Geometry H

PAUSD Math *Acceleration Path Possibilities*

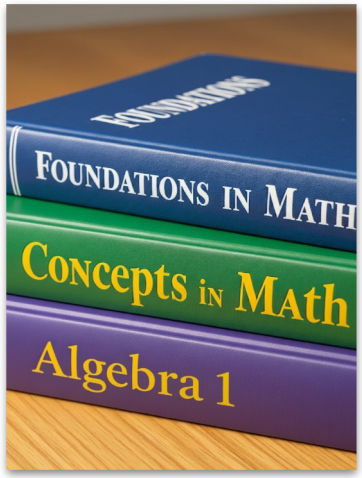
CCSS grades 6, 7, 8, Algebra 1, and Geometry

FIVE Years of Math in Three Years



Potential to reach Calculus BC by junior year.

Turning Challenges into Opportunities



Standards & PAUSD course aligned

Fair opportunity for all interested students

Reduction in testing time

Minimize impact on teachers & instructional time

Building the Partnership
Co-Development in Action

- ★ Clear purpose
- ★ Focus on accurate placement
- ★ Reduce testing from 2 days to 1 day
- ★ Mix of machine- and human-scored items
- ★ PAUSD math leads + WestEd assessment experts
- ★ Collaborative decision-making at each step
- ★ Shared commitment to rigor, customization, transparency
- ★ Iterative design: blueprint → item trials → validation

Palo Alto and WestEd–The First Meeting

- Understand Palo Alto and the history of the Math Validation Process
- Understand Palo Alto's vision for what a new Math Validation Process might look like
- Determine the key messages that emerged from the meeting
  - Move from a two-session test to a one-session test
  - Reduce burden on educator time for both administration and scoring
  - Provide evidence of assessment score validity

How We Used Principles of Large-Scale Assessment Development

Purpose	Define the purpose of the assessment.
Design	Develop a test design and a blueprint that can deliver on the purpose.
Develop	Develop assessment content (i.e., items) that can elicit evidence related to the assessment purpose.
Validate	Validate the individual items and the assessment scores.

Validate

From the beginning, we purposely discussed and designed for validation:

- Conduct a review of items by Palo Alto instructional leads
- Utilize item tryouts of newly developed items before using them operationally
- Utilize a research-based strategy to establish an operational cut score for each assessment
- Conduct a study to compare student placement and class performance

Psychometric Rigor

- ★ Tryout item analyses (on-course)
- ★ Operational item analyses (validation test)
- ★ Psychometric review of every test item after each administration
- ★ Cut score study and validity analyses following validation test

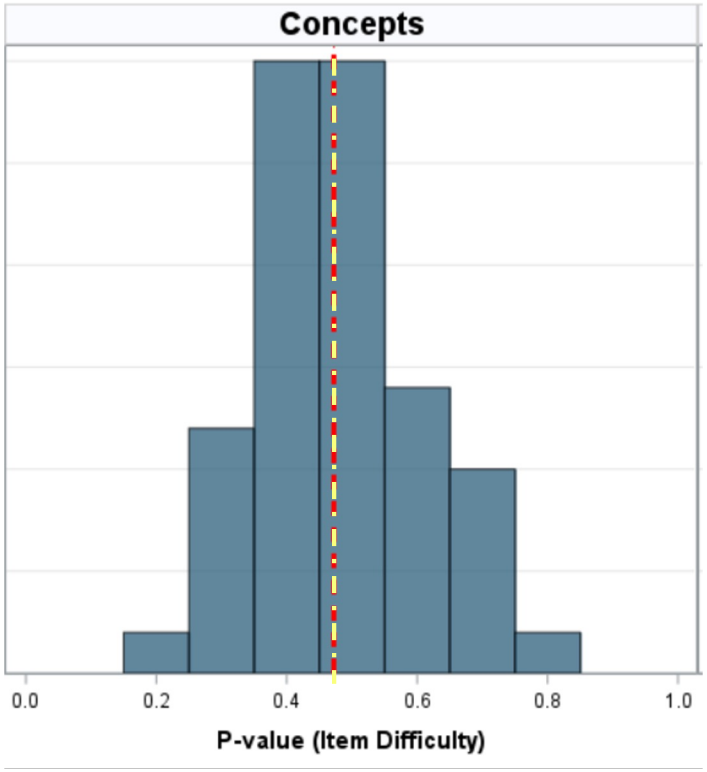
Data Review

Item Analyses (following every administration):

- P-values (difficulty): Items ranged from easy to hard as intended
- Item-total correlations (ITC): Verified items discriminate appropriately
- Items with ITC below 0.20 were reviewed; one item per test removed

Form Reliability:

- Foundations: Cronbach's alpha = 0.93
- Concepts: Cronbach's alpha = 0.92
- Algebra: Cronbach's alpha = 0.93



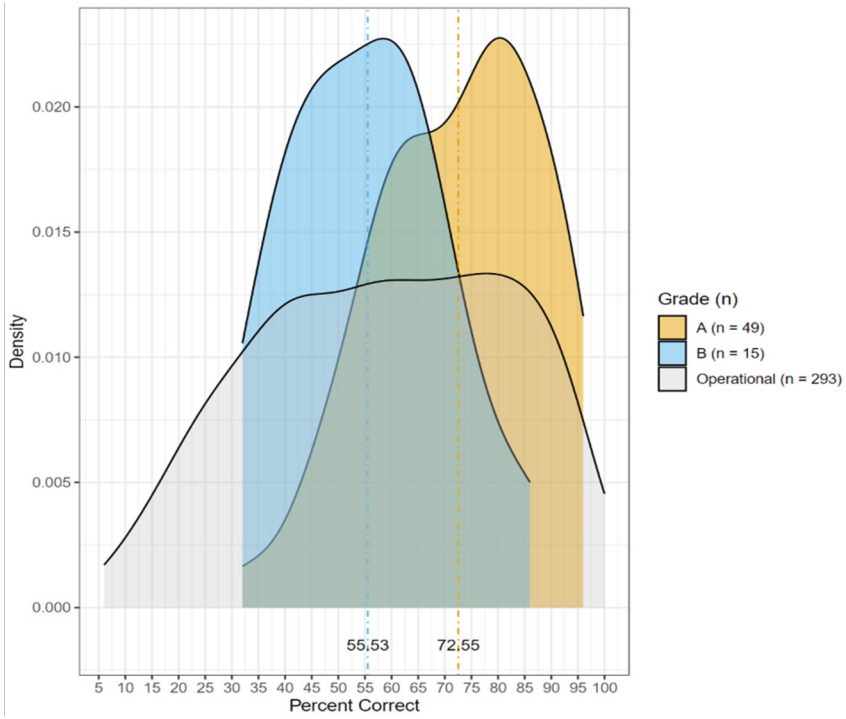
Cut Score Methods

Modified Contrasting-Groups Approach:

- On-course students took each validation test
- Compared performance by semester course grades
  (A vs. B students)
- Cut scores informed by score distributions and historical pass rates
- Expert judgment combined with empirical data

Results:

- Foundations: 70% qualifying score
- Concepts: 60% qualifying score (more challenging form)
- Algebra: 70% qualifying score



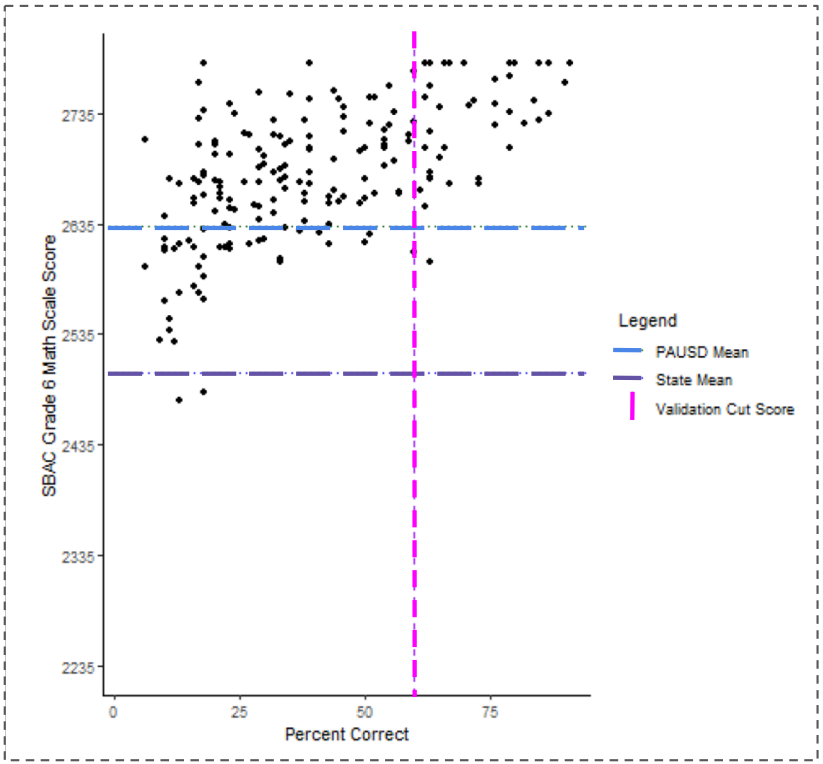
Score distributions by semester grade (Foundations test)

Validity Evidence

Two Validation Studies

1. **Concurrent: SBAC Math Comparison (Spring 2024):**

- Students who qualified scored significantly higher on grade-level SBAC.
    - The graph shows results for students who sat for the Concepts test.
- All three tests showed statistically significant differences (p<.001)
- Linear relationship between validation test performance and SBAC scores

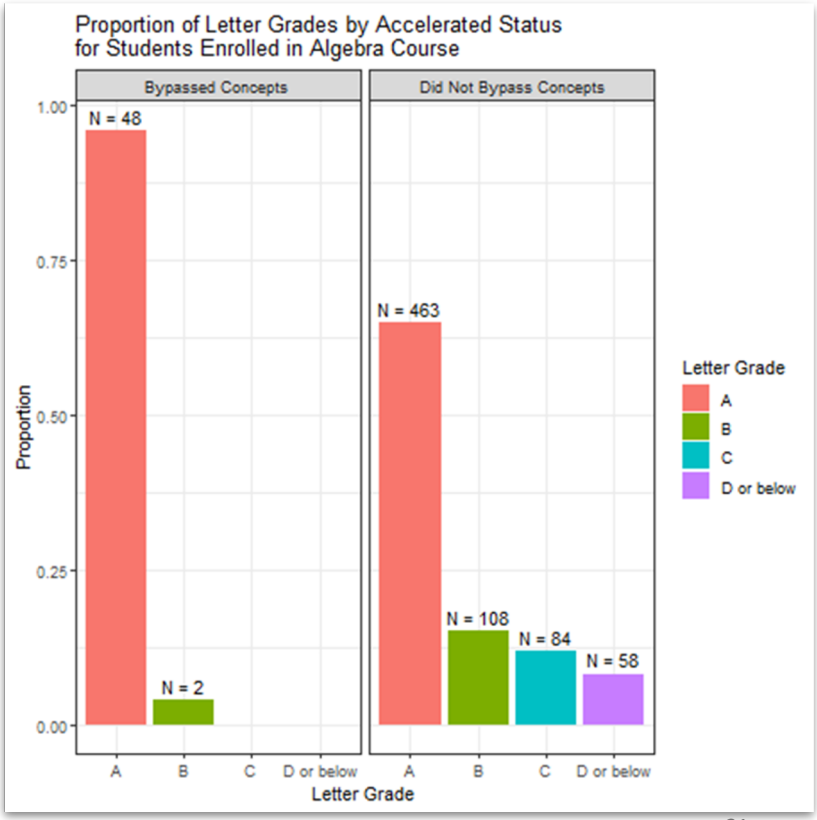


Validity Evidence

Two Validation Studies

2. Predictive: Course Grade Analysis (Fall 2024):

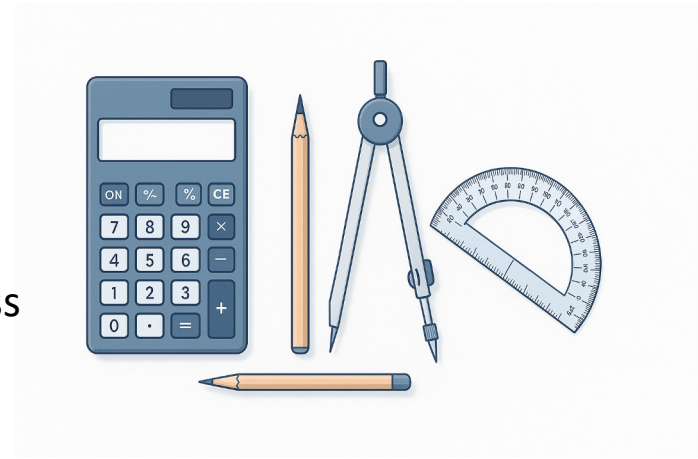
- Students who accelerated performed strongly in accelerated courses the following academic year.
- Comparable or better performance than non-accelerated peers

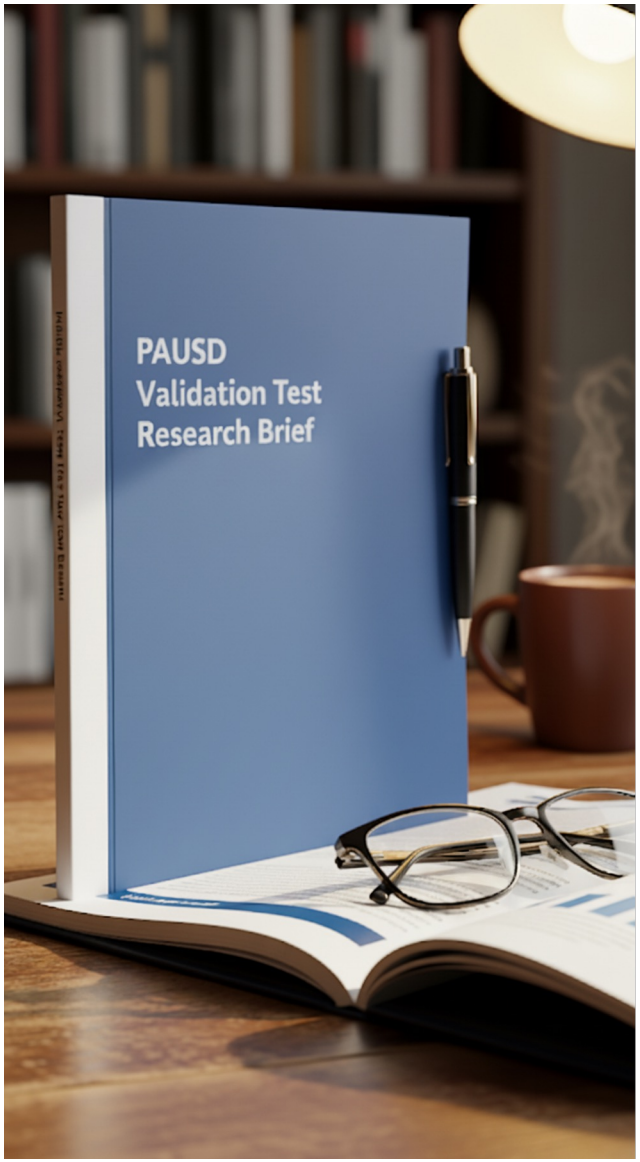


Psychometric Summary

Psychometric Rigor Supports Equitable Placement

- High reliability ensures consistent measurement
- Item analysis confirms each question functions as intended
- Empirically-derived cut scores balance access with readiness
- Validity studies provide evidence for accurate placement
- Transparent documentation builds community trust





Transparency Through Research Brief

- Technical documentation
- Includes design, results, and ongoing updates
- Builds community trust through openness

Early Outcomes & Key Takeaways

- ★ Streamlined logistics and less teacher burden
- ★ Positive feedback
- ★ Initial data show successful student placement

Strong Partnerships Produce Strong Systems

Transparency Builds Trust

Psychometric Rigor Ensures Equity

Assessment Can Expand Opportunity

Looking Ahead

Use Assessment Purposefully

Sustain Partnerships; Include Teachers & Content Leads

Monitor Student Outcomes Post-Acceleration

Engage Psychometric Expertise When We Can

Conduct Ongoing Data Analysis & Refinements

Share Findings Openly with Community

Contact Us

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PAUSD Math Validation Research Brief
pausd.org/learning/curriculum/math

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THANK YOU