THE SCHOOL DISTRICT OF PHILADELPHIA

Office of Evaluation, Research, and Accountability

Research Roundup Webinar Series #2: Assessing Student Math Performance in Grades 3-8

April 20, 2022

Agenda

- About ERA and the Research Roundup Webinar Series
- **Part 1:** Math in grades 3-8: What is it and why is it important?
- **Part 2:** How the within-year tests we administer measure math skills
- **Part 3:** Additional context and resources
- Q & A

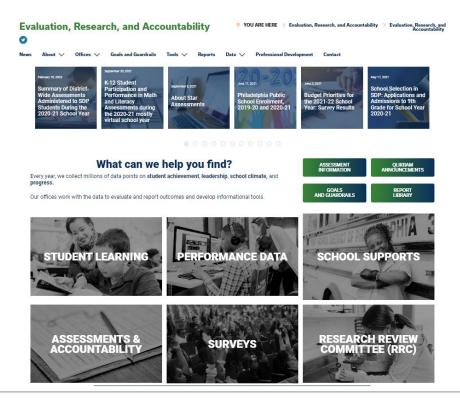
This webinar is being recorded.

The recording and a PDF of the slide deck will be available at: <u>philasd.org/research/roundup</u>

Please introduce yourself in the chat!

Evaluation, Research, and Accountability

philasd.org/era



Office of Research and Evaluation

District Performance Office

Planning and Evidence-Based Supports Office

Office of Assessments

Office of Data Governance

Evaluation, Research, and Accountability

PHILADELPHIA Compare Schools User Guide Video Tutorials SCHOOL PROFILES PHILADELPHIA PUBLIC SCHOOLS DATA FOR DISTRICT, CHARTER, ALTERNATIVE, AND OTHER/CYBER STUDENTS AND SCHOOLS Find out how a school or group of schools is performing. Enrollment: 2021-2022 (next update November 2022) Performance data: 2020-2021 for Attendance and College & Career data: 2019-2020 for suspension rates: 2020-2021 for Search for a school or narrow your search using the Survey results: 2018-2019 for all other data due to COVID (next update February 2022) filters below. You can also view data for groups of schools (for example, all Charter Schools or all Network 1 schools) by clicking on "School Groupings." In Spring 2020, students and schools were impacted by COVID-19, including related closures and assessment cancellations. Comparison of 2019-20 data to prior years should be made with caution. Find a School School Groupings Search for a school: 198,645 TOTAL ENROLLMENT Filters SCHOOL DISTRICT OF PHILADELPHIA TOTAL SCHOOLS CENTRAL OFFICE ACADEMY AT PALUMBO 440 N. Broad Street Philadelphia, PA 19130 ACADEMY FOR THE MIDDLE YEARS (AMY) AT p: 215-400-4000 NORTHWEST DISTRICT SCHOOLS 216 SUPERINTENDENT ENROLLMENT 114,902 AD PRIMA CHARTER SCHOOL William R. Hite, Jr., Ed.D. ADAIRE ALEXANDER SCHOOL CHARTER SCHOOLS 85 ENROLIMENT 66 890 ALLEN, DR. ETHEL SCHOOL 2018-19 PSSA & KEYSTONE - (1) ALTERNATIVE SCHOOLS 24 ALLEN ETHAN SCHOOL ELA PERFORMANCE (ALL ENROLLMENT 2,766 GRADES) ALLEN, RICHARD PREPARATORY CHARTER **OTHER/CYBER CHARTERS** SCHOOL ENROLIMENT 14,087 1 POINT ALLIANCE FOR PROGRESS CHARTER SCHOOL DECREASE FROM LAST ALTERNATIVE MIDDLE YEARS (AMY) AT VEAD DISTRICT PROGRESS TOWARDS GOALS AND JAMES MARTIN The percentage of students who scored MORE PUBLIC SCHOOLS DATA Proficient or Advanced on the state ANDERSON, ADD B. SCHOOL standardized English Language Arts exam. DISTRICT FAST FACTS ARTHUR, CHESTER A, SCHOOL ARTS ACADEMY AT BENJAMIN RUSH 2018-19 PSSA & KEYSTONE - (1) 2018-19 READING ON GRADE

philasd.org/opendata

School Information

Click below to expand the table to view a description of the data and download a data set for a specific school year. You can also download a Zip file that contains all available years for a specific School Information category.

The public release of this data supports our goals to promote greater transparency and community engagement. Before accessing these data, please review the Terms and Conditions.

School Lists
 School Enrollment & Demographics
 District Enrollment & Demographics
 Pre-School Information
 Catchment Feeder Schools
 School Catchment Areas
 School Catchment Retention Details
 School Catchment Retention Counts
 District Wide Surveys

Data Sets

O School Information	tes
School Performance Student performance and clima through the school year	ate
District Employees an Finance Expenditure, Employee, Budge Data	
Advancing Education Information on hybrid learning COVID-19 testing	
Terms and Condition Please read!	S
Quick Data	
ج School Profiles	

schoolprofiles.philasd.org

Evaluation, Research, and Accountability

THE SCHOOL DISTRICT OF

Assessment Overview 2021-22

August 2021

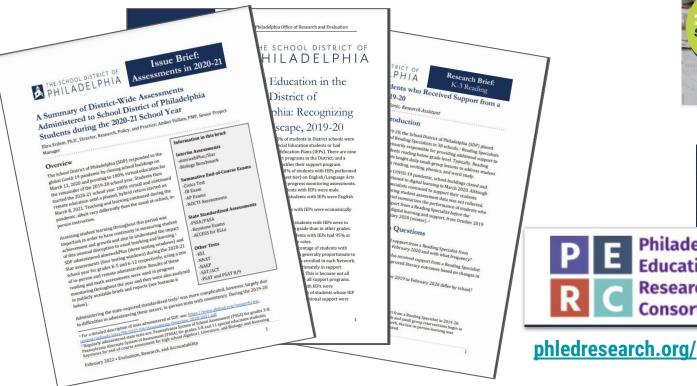
Office of Evaluation, Research, and Accountability (ERA) Assessment Calendar | Office of Assessment

philasd.org/era/assessment/

PHILADELPH	AIA	Board	of Educ	ation	Progre	ss Mon	itoring		A 🗎
RVIEW GOALS «	GOAL 1 READING 3-8	GOAL 2 READING K-3		OAL 3 ATH 3-8	GOAL HS PERFORM		GOAL 5 COLLEGE & CA		GUARDRA
IUAL	FALL		WINT	ER		SPR	ING		
Sections		Math Go	oal 3 Perf	formance	e: Overal	l and by !	Student (Group	
Overall and Student Groups									
Grade Level Off-Track, Near-Track, On- Track Schools	The percentage of st August 2026	udents in grad	les 3-8 who are		- Board Goa e state Math as		ow from 21.6% i	in August 2019	to 52.0% by
Goal 3 Links					100.0% 90.0% 80.0%			Annual	Goals
raii Winter					70.0%				52.0
WHITEH	1	Goal Overa			50.0%			33.8% ^{39.4}	45.4%
Spring					30.0%		24.6%		
Spring		Near-	Irack		20.0%	18.9% 20.2% 21			
Spring Distance Colors Below Target		Near-	Irack						
Distance Colors Below Target At/Above Target		Near-	Irack		20.0%		w19 2010-20 2020-23	101-22 102-23 103-	
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Distance Colors Below Target At/Above Target Score Colors < 50% of Target At Target	Black / African	2016-17 18.9%	M: 2017-18 20.2%	Grades 2018-19 21.6%	200% 100% 0.0% District-Wide 3-8, PSSA M 2019-20 ² N/A	Proficiency iath 1 2020-21 Annual Goal 24.6%	2020-21 Goal -3.0	201 ¹²³ 201 ²³ 201 ³ Distance to 2021-22 Goal -7.1	²⁶ یوید 2025-26 Fi Goal 52.0%
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Distance Colors Below Target At/Above Target Score Colors < 50% of Target At Target	Black / African American Hispanic / Latinx	2016-17 18.9% 9.6% 12.4%	Ma 2017-18 20.2% 10.7% 13.3%	Grades 2018-19 21.6% 11.4% 14.4%	220% 199% Bow 2019-20 ² N/A N/A N/A	Proficiency ath 1 2020-21 Annual Goal 24.6% 24.6%	م ^{2/3} م ^{2/2} م ^{2/2} م ^{2/2} ath Distance to 2020-21 Goal -3.0 -13.2 -10.2	Distance to 2021-22 Goal -7.1 -17.3 -14.3	2025-26 Fit Goal 52.0% 52.0%
Distance Colors Below Target At/Above Target Score Colors < 50% of Target At Target	Black / African American Hispanic / Latinx White American Indian /	2016-17 18.9% 9.6% 12.4% 37.7%	Ma 2017-18 20.2% 10.7% 13.3% 39.7%	Grades 2018-19 21.6% 11.4% 14.4% 42.9%	2005 1005 2005 2019-20 ² N/A N/A N/A N/A	9000 900 900 900 900 900 900 900 900 90	201	Distance to 2021-22 Goal -7.1 -17.3 -14.3 +14.2	2025-26 Fit Goal 52.0% 52.0% 52.0%
Distance Colors Below Target At/Above Target Score Colors < 50% of Target At Target	Black / African American Hispanic / Latinx White American Indian / Alaskan Native	2016-17 18.9% 9.6% 12.4% 37.7% 25.8%	Ma 2017-18 20.2% 10.7% 13.3% 39.7% 18.1%	Grades 2018-19 21.6% 11.4% 14.4% 42.9% 18.7%	200 200 100 200 000 2019-20 ² N/A N/A N/A N/A N/A N/A	24.6% 24.6% 24.6%	Distance to 2020-21 Goal -3.0 -13.2 +18.3 -5.9	Distance to 2021-22 Goal -7.1 -17.3 -14.3 +14.2 -10.0	2025-26 Fa Goal 52.0% 52.0% 52.0% 52.0%

Office of Research and Evaluation

philasd.org/research



OUR SAY 2021 Survey of Philly Public School Parents HAT YOUSAY HELPS US PROVE AND S SCHOOLS

philasd.org/dws



Education

Consortium

Research

External Research Review

Comprehensive information about the Research Review Committee process - a requirement before cting any research in SDP Philadelphia

philasd.org/research/programsservices/reports/

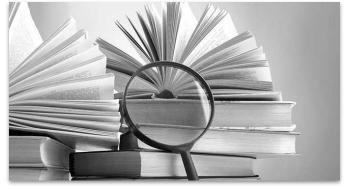
Research, Policy and

Practice Conference

What is a Research Roundup?

- Monthly webinar series with a topical focus
- Work in progress
- Sign up to be notified when webinars are scheduled and when recordings are available

www.philasd.org/research/roundup



Goals for This Presentation

Attendees will better understand:

- 1. Key math skills covered in grades 3-8
- 2. How the District's within-year tests (Renaissance Star) measure math skills
- 3. How we track the progress of students' math skills over time (PSSA & Star)



Part 1: Math in grades 3-8: What is it and why is it important?

Major Work in Grades 3-5

Multiplication and division of whole numbers and fractions - concepts, skills, and problem solving

Grade 3	Grade 4	Grade 5
Algebra: Operations & Algebraic Thinking Represent and solve problems involving multiplication and division Understand properties of multiplication and the relationship between multiplication and division Multiply and divide within 100 Solve problems involving the four operations, and identify and explain patterns in arithmetic Measurement & Data Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects Geometric measurement: Understand concepts of area and relate area to multiplication and to addition Numbers & Operations: Fractions Develop understanding of fractions as numbers	 Algebra: Operations & Algebraic Thinking Use the four operations with whole numbers to solve problems Numbers & Operations: Base Ten Generalize place value understanding for multi-digit whole numbers Use place value understanding and properties of operations to perform multi-digit arithmetic Numbers & Operations: Fractions Extend understanding of fraction equivalence & ordering Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers Understand decimal notation for fractions, and compare decimal fractions 	 Measurement & Data Geometric measurement: Understand concepts of volume and relate volume to multiplication and to addition Numbers & Operations: Base Ten Understand the place value system Perform operations with multi-digit whole numbers and decimals to hundredths Numbers & Operations: Fractions Use equivalent fractions as a strategy to add and subtract fractions Apply and extend understandings of multiplication and division to multiply and divide fractions
Required Fluencies Single-digit products and quotients Add/subtract within 1000	Required Fluencies Add/subtract within 1,000,000	Required Fluencies Multi-digit multiplication

Major Work in Grades 6-8

Ratios & proportional relationships, expressions & equations, arithmetic of rational numbers, linear equations & linear functions

Grade 6	Grade 7	Grade 8
Algebra: Expressions & Equations	Algebra: Expressions & Equations	Algebra: Expressions & Equations
 Apply and extend previous understandings of arithmetic to algebraic expressions Reason about and solve one-variable equations and inequalities Represent and analyze quantitative relationships between dependent and independent variables 	 Use properties of operations to generate equivalent expressions Solve real-life and mathematical problems using numerical and algebraic expressions and equations Numbers & Operations: 	 Work with radicals and integer exponents Understand the connections between proportional relationship, lines, and linear equations Analyze and solve linear equations and pairs of simultaneous linear equations
Numbers & Operations:	Ratios & Proportional Relationships	Functions
Ratios & Proportional Relationships	Analyze proportional relationships and use them to solve real-world and mathematical problems	 Define, evaluate, and compare functions Use functions to model relationships between quantities
Understand ratio concepts and use ratio reasoning to solve problems	Numbers & Operations: The Number System	Geometry
Numbers & Operations: The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational	Understand congruence and similarity using physical models, transparencies, or geometry software
 Apply and extend previous understandings of multiplication and division to divide fractions by fractions Apply and extend previous understandings of numbers to the system of rational numbers 	numbers	Understand and apply the Pythagorean Theorem
Required Fluencies		
 Multi-digit division Multi-digit decimal operations 		Information taken from achievethecore.org

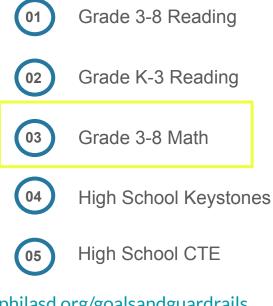
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Domain Group	Domain Name	РК	к	1	2	3	4	5	6	7	8	A1	GM	A2
	Operations and Algebraic Thinking	•												
	Expressions and Equations								•	•				
Algebra	Seeing Structure in Expressions											•		•
	Arithmetic with Polynomials and Rational Expressions											•		•
	Creating Equations											•		•
	Reasoning with Equations and Inequalities											•		•
	Functions										•			
	Interpreting Functions											•		•
Functions	Building Functions											•		•
	Linear, Quadratic, and Exponential Models											•		
	Trigonometric Functions													•
	Modeling with Geometry												•	
	Geometry	•	•	•	•	•	•	•	•	•	•			
	Congruence		_										•	
Geometry	Similarity, Right Triangles, and Trigonometry												•	
	Circles		-										•	
	Expressing Geometric Properties with Equations												•	
	Geometric Measurement and Dimension												•	
Measurement and Data	Measurement and Data	•	•(•	•	•	•	•(
	Vector and Matrix Quantities													•
Number and Quantity	The Real Number System								-					
	Quantities											•		
	The Complex Number System													•
	Counting and Cardinality	•	•											
	Number and Operations in Base Ten		•	•	•	•	•	•						
umbers and Operations	Number and Operations—Fractions					•	•	•		·				
	Ratios and Proportional Relationships								•	•				
	The Number System								•	•	•			
	Statistics and Probability								•	•	•			
	Interpreting Categorical and Quantitative Data											•		•
Statistics and Probability	Making Inferences and Justifying Conclusions													•
	Conditional Probability and the Rules of Probability												•	
	Using Probability to Make Decisions												•	

Part 2: How the District's within-year tests measure math skills

Board Goals and Guardrails

GOALS



philasd.org/goalsandguardrails philasd.org/era/goals-and-guardrails/

GUARDRAILS



Welcome and Supportive Schools



Enriching and Well-Rounded School Experiences



Partnering with Parents and Families



Addressing Racist Practices



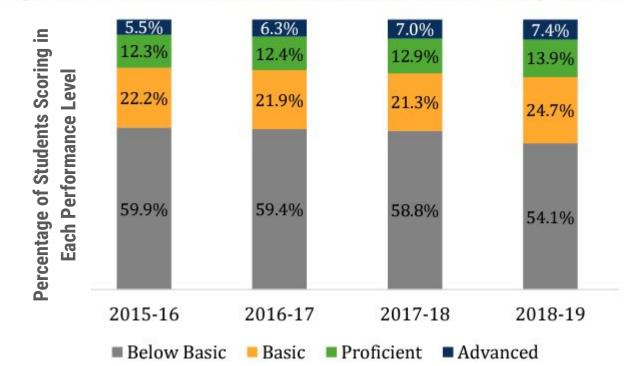
Goal 3: Math (Grades 3-8)

<u>Goal 3</u>: The percentage of students in grades 3-8 who are proficient on the PSSA math will grow from 21.6% in August 2019 to 52.0% by August 2026. **Target 2021-22: 28.7%**

Indicator 3.1:

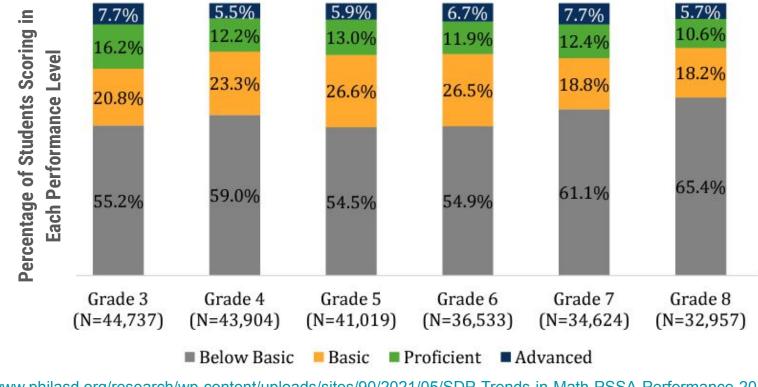
The percentage of students in grades 3-8 who score at or above grade-level on the District's within-year math assessment in Fall, Winter, and Spring each year. **Target 2021-22: 33.8%**

Figure 1. Overall SDP Performance Levels on the Math PSSA Exam, by Year, 2015-16 through 2018-19



https://www.philasd.org/research/wp-content/uploads/sites/90/2021/05/SDP-Trends-in-Math-PSSA-Performance-2015-16-t o-2018-19-Report-April-2021.pdf

Figure 3. Performance Levels by Grade, Combined 2015-16 through 2018-19



https://www.philasd.org/research/wp-content/uploads/sites/90/2021/05/SDP-Trends-in-Math-PSSA-Performance-2015-16-t 0-2018-19-Report-April-2021.pdf

40%

35%

30%

25%

20%

15%

Lines indicate combined Proficient/Advanced rates for each grade

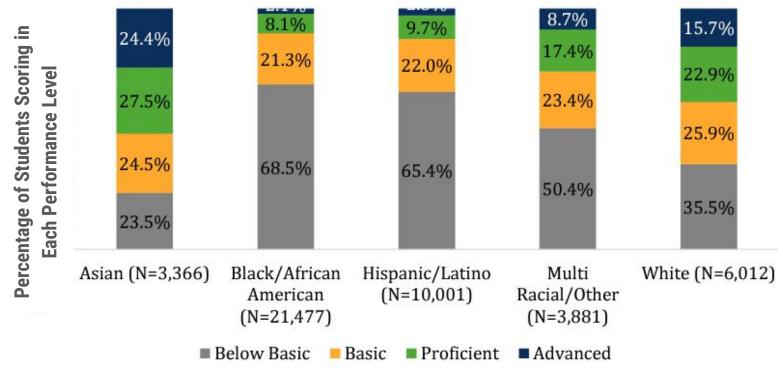


10%

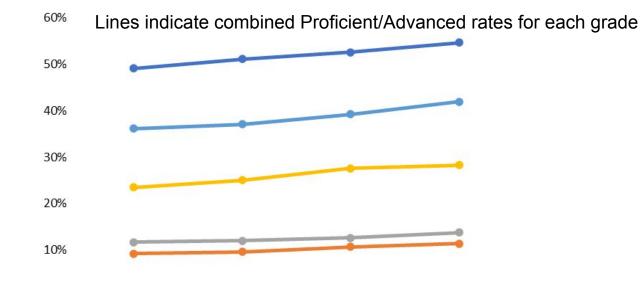
5%

0%				
	2015-16	2016-17	2017-18	2018-19
Grade 3	21.6%	23.1%	24.5%	26.9%
🗕 Grade 4	17.4%	17.4%	16.8%	19.0%
Grade 5	17.2%	17.6%	19.9%	20.8%
🗕 Grade 6	17.3%	17.7%	19.6%	19.7%
Grade 7	17.5%	19.2%	21.3%	22.2%
Grade 8	14.7%	15.8%	16.7%	18.1%

Figure 8. Performance Levels by Race/Ethnicity, Combined 2015-16 through 2018-19



https://www.philasd.org/research/wp-content/uploads/sites/90/2021/05/SDP-Trends-in-Math-PSSA-Performance-2015-16-t 19 0-2018-19-Report-April-2021.pdf



0%					
0%	2015-16	2016-17	2017-18	2018-19	
Asian	49.2%	51.1%	52.6%	54.7%	
Black/African American	9.2%	9.5%	10.6%	11.4%	
	11.7%	11.9%	12.6%	13.7%	
Multi Racial/Other	23.5%	25.0%	27.6%	28.3%	
	36.1%	37.1%	39.2%	42.0%	

Two Types of Star Assessments

CAT

Computer Adaptive Tests (3-12)

Adaptive tests that adjust the difficulty of items depending on how the student performed on previous items.

- Domains:
 - Numbers and Operations
 - Algebra
 - Geometry and Measurement
 - Data Analysis, Statistics, and Probability

CBM Curriculum-Based Measures (K-3)

1-minute probes that measure foundational math skills.

- Kindergarten: Numeral Recognition, Quantity Comparison
- 1st Grade: Numeral Recognition, Quantity Comparison, Addition to 10
- 2nd Grade: Addition to 10, Addition to 20, Subtraction from 10
- 3rd Grade: Subtraction from 10, Mixed Addition and Subtraction, Multiplication to 100

Star Math Computer Adaptive Test

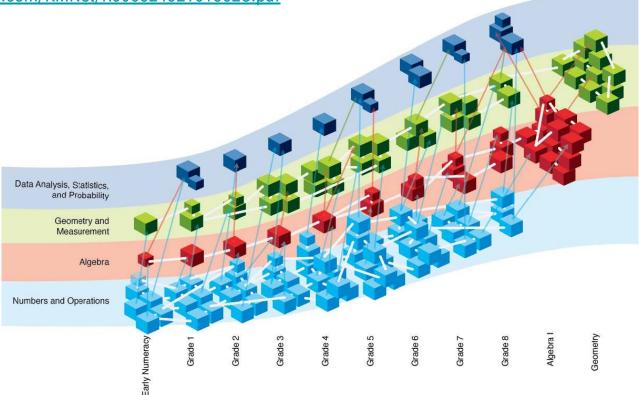
Four domains \rightarrow 54 skill areas \rightarrow 790 grade-specific skills

Domain	Example Skill Areas
Numbers and Operations	 Decimal Concepts and Operations Integers
Algebra	 Evaluate Numerical Expressions Linear Equations and Inequalities
Geometry and Measurement	 Right Angles and Trigonometry Two-Dimensional Shapes and Attributes
Data Analysis, Statistics, and Probability	 Data Representation and Analysis Combinatorics and Probability

https://help2.renaissance.com/US/PDF/SM/SMRPTechnicalManual.pdf

Star Math Computer Adaptive Test

https://doc.renlearn.com/KMNet/R00552482161352C.pdf



Example Geometry & Measurement CAT Problems

3rd Grade

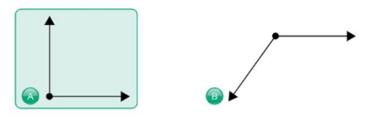
4th Grade

What temperature does the thermometer show?

°F 70°



Which of the angles appears to be a right angle?





Example Geometry & Measurement CAT Problems

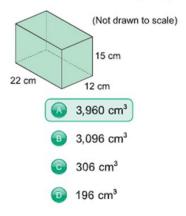
5th Grade

6th Grade

The radius of a circle is 9 inches. What is the diameter of the circle?



What is the volume of the rectangular prism?



Example Geometry & Measurement CAT Problems

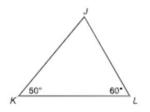
7th Grade

130°

80°

8th Grade

What is the measure of angle J?

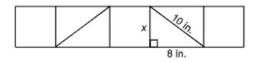


110°

70°

D

Abram is designing a tile pattern made up of squares and right triangles for a kitchen backsplash.



What is x, the height of the row of tiles?



Star Math Performance: Grades 3-8

At/Above Benchmark (70-100%ile) In Math On Watch (25-69%ile) in Math

■ Strategic Intervention (10-24%ile) in Math ■ Intensive Intervention (<10%ile) in Math



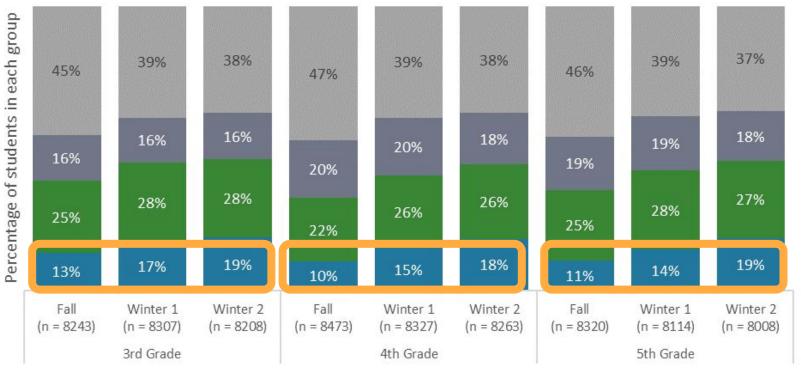
The percentage of 3rd-8th grade students scoring **At/Above Grade Level** increased by seven percentage points from fall (September) to winter 2 (March).

Source: Qlik Academic Screeners Dashboard, Accessed March 28, 2022

Star Math Performance: Grades 3-5

The percentage of 3rd-5th grade students scoring **At/Above Grade Level** increased by six to eight percentage points from fall (September) to winter 2 (March)

At/Above Benchmark (70-100%ile) In Math On Watch (25-69%ile) in Math Strategic Intervention (10-24%ile) in Math Intensive Intervention (<10%ile) in Math

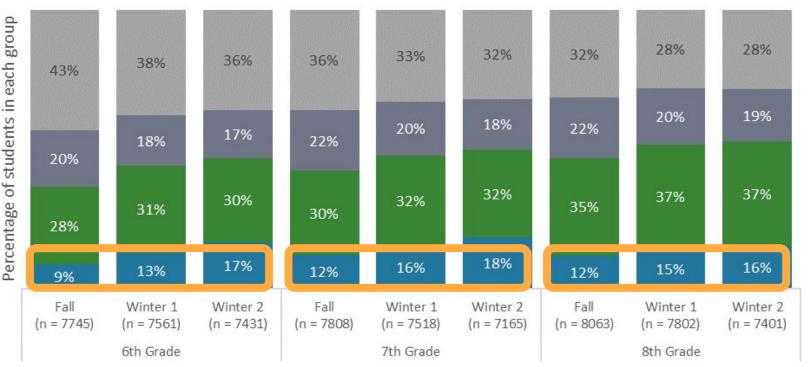


Source: Qlik Academic Screeners Dashboard, Accessed March 28, 2022

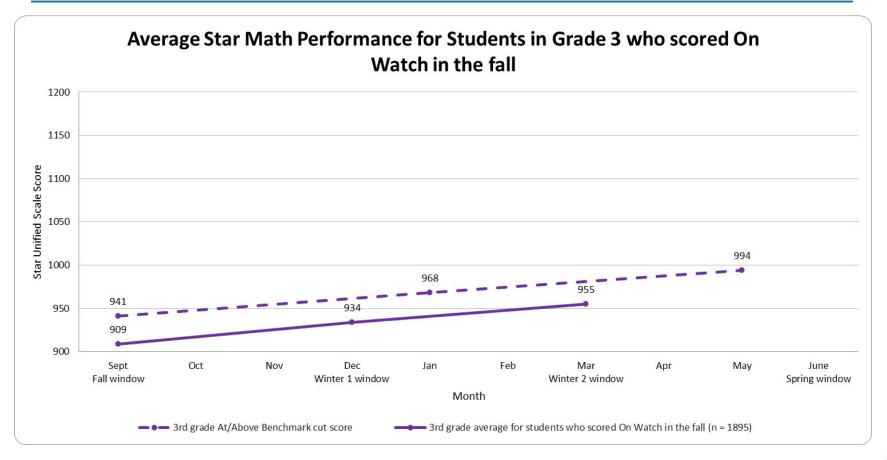
Star Math Performance: Grades 6-8

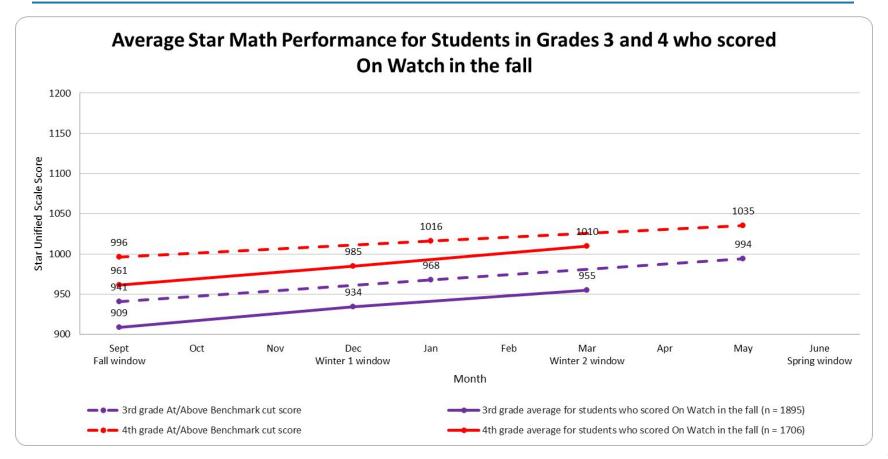
The percentage of 6th-8th grade students scoring **At/Above Grade Level** increased by four to eight percentage points from fall (September) to winter 2 (March).

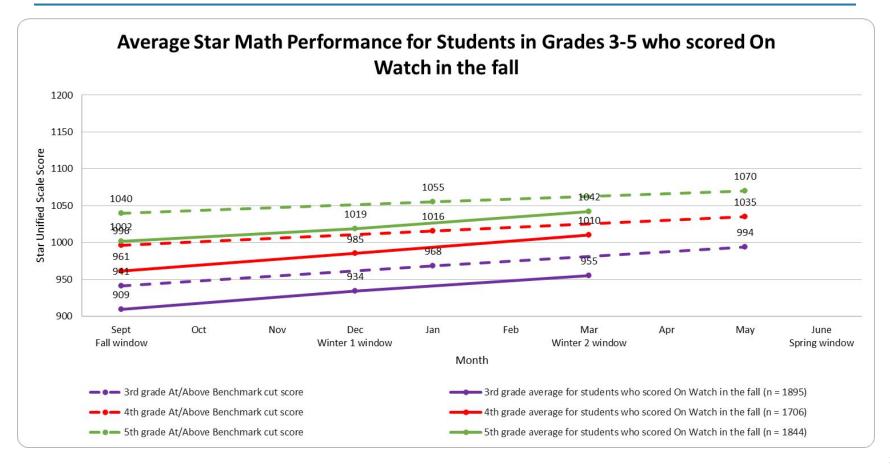
At/Above Benchmark (70-100%ile) In Math On Watch (25-69%ile) in Math Strategic Intervention (10-24%ile) in Math Intensive Intervention (<10%ile) in Math

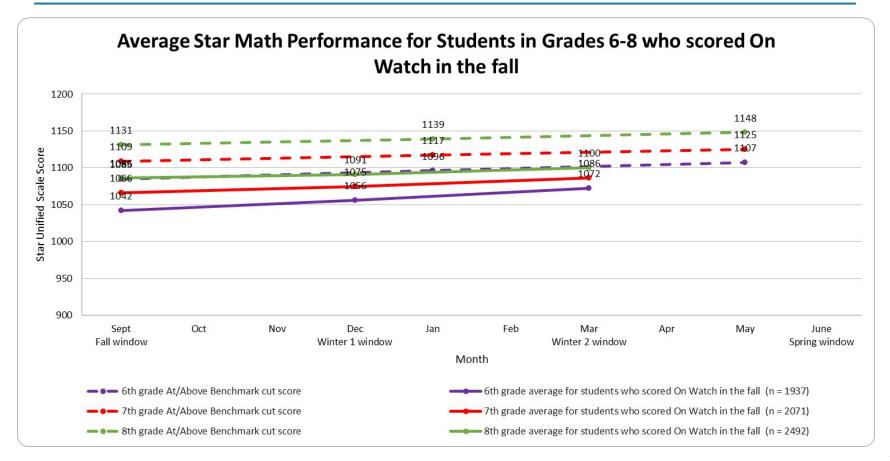


Source: Qlik Academic Screeners Dashboard, Accessed March 28, 2022









Part 3: Additional Context and Resources

Renewed focus on math

- With the introduction of Star we now have a single assessment to track math progression across grades
- Explicitly included in one of our five Board Goals (Goal 3)
- Revised Academic Framework

Goal 3 (Grade 3-8 Math): Progress Toward the Board Goal % of students in grades 3-8 who are at or above grade level



% At/Above Grade Level	Fall	Winter	Winter 2	Spring	2021-22 Annual Target
2021-22	11.2%	15.0%	18.0%	Forthcoming	33.8%

Additional math resources

Math Instructional Guide

Math Scope and Sequence

ORE Website



Join our mailing list to be notified when recordings are available and when webinars are scheduled. We also welcome your suggestions for future topics. Link in the chat!