PINE-RICHLAND SCHOOL DISTRICT

Pine-Richland School District
K-12 Mathematics Program Review

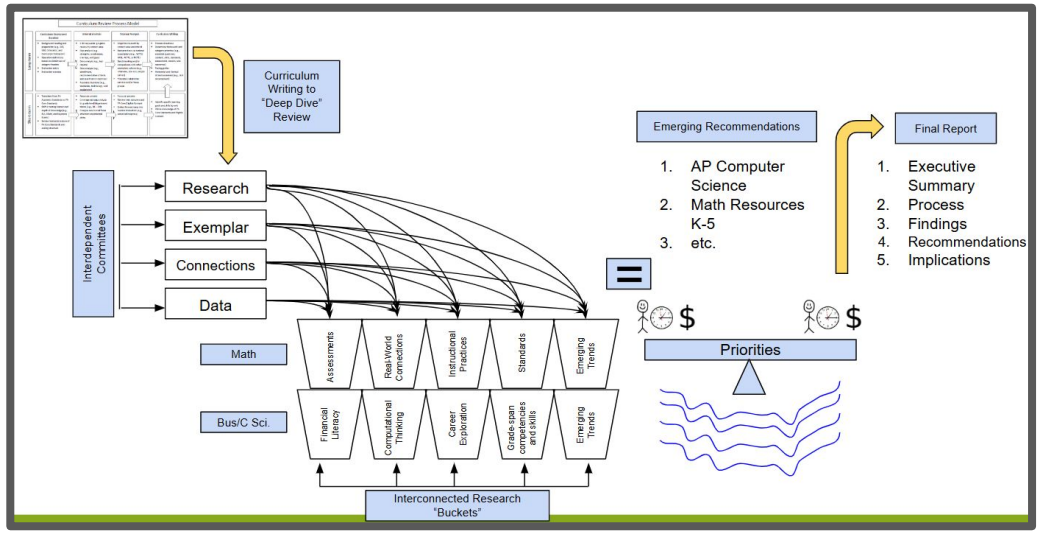
May 18, 2026

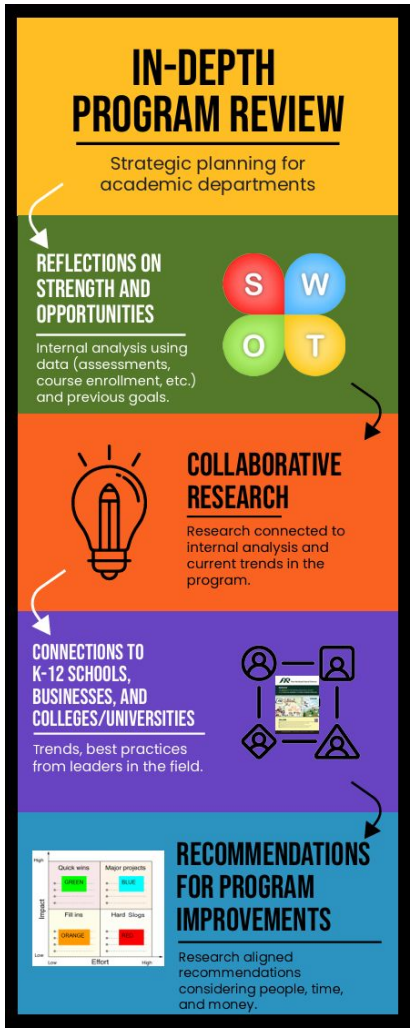


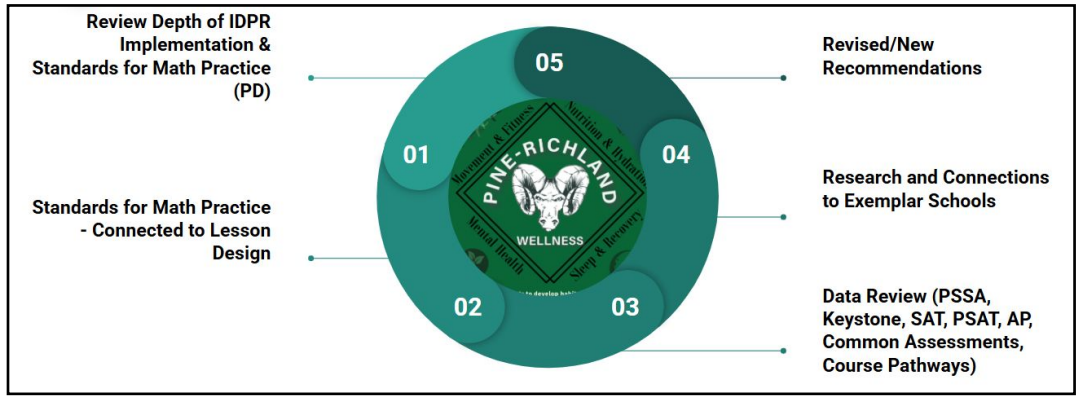




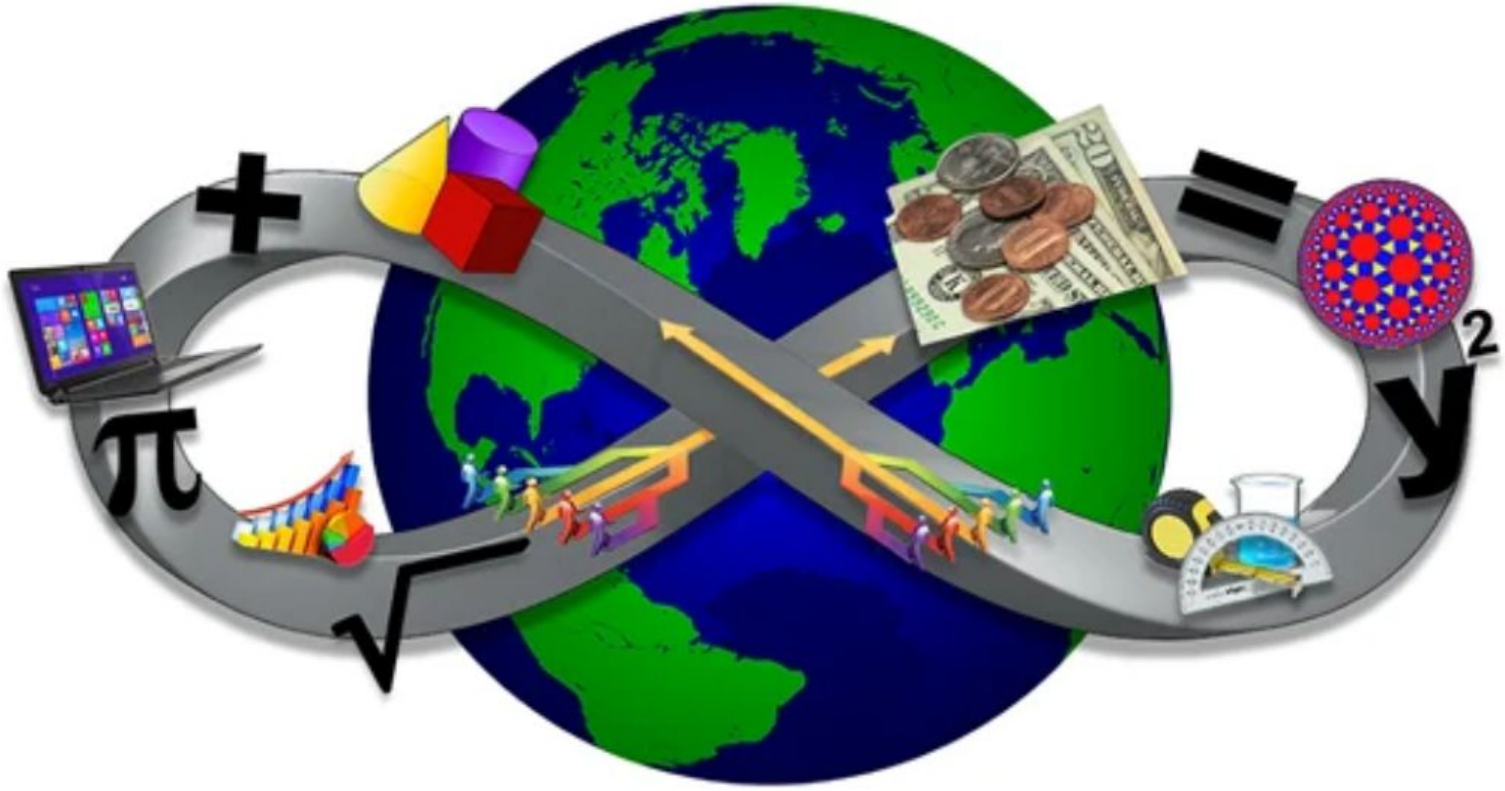
Why In-Depth Program Reviews?







2017 - 2018 Mathematics Program Review



Mathematics has infinite beauty that allows students to grow and pursue their individual goals through the integration of fundamental skills, abstract concepts, reasoning, and real-world applications.

Mathematics Department Mini-Review

Review Depth of IDPR Implementation & Standards for Math Practice (PD)

Standards for Math Practice - Connected to Lesson Design



Revised/New Recommendations

Research and Connections to Exemplar Schools

Data Review (PSSA, Keystone, SAT, PSAT, AP, Common Assessments, Course Pathways)



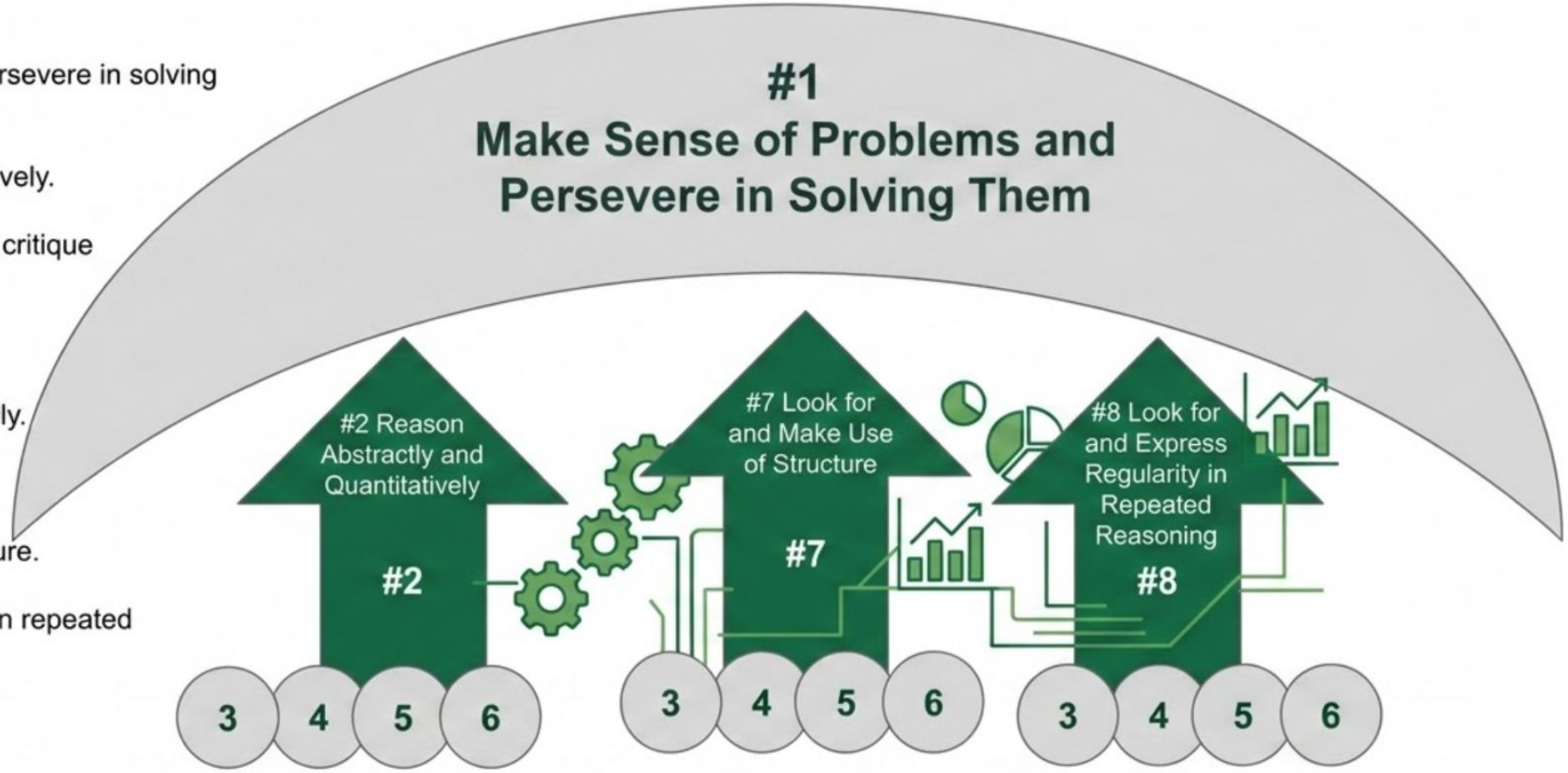
Recommendation #1: Vision

Expand the vision statement to include a focus on the **Standards for Mathematical Practice** [(1) Make sense of problems and persevere in solving them; (2) Reason abstractly and quantitatively; (3) Construct viable arguments and critique the reasoning of others; (4) Model with mathematics; (5) Use appropriate tools strategically; (6) Attend to precision; (7) Look for and make use of structure; (8) Look for and express regularity in repeated reasoning] and real-world practical application, by leveraging high-cognitive-demand math tasks.

Updated Vision & Philosophy

The 8 Standards for Math Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.



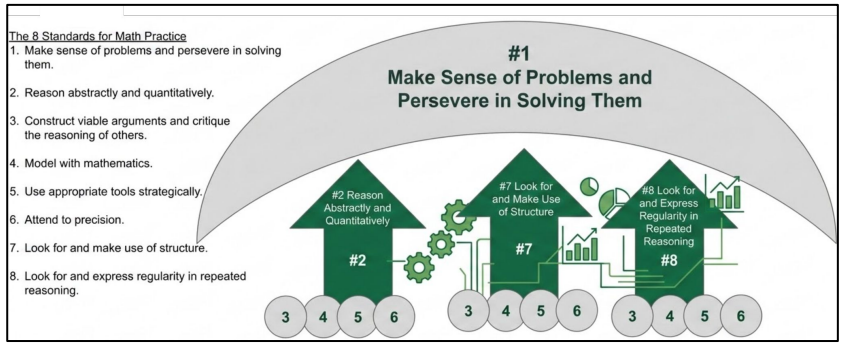
Standards for Mathematical Practice

WHAT IT IS...

- Instructional approach to help students to more deeply understand math concepts.
- Helping students to become "math thinkers".
- Teaching students how to think and reason mathematically (problem solvers).

WHAT IT IS NOT...

- "New" Math
- Elimination of foundational facts and skills.
- Replacing direct instruction.



Traditional vs. SMP (Elementary)

Traditional

1. Tell students the properties of 2-D shapes.
2. Tell students the properties of 3-D shapes.
3. Have students complete a worksheet comparing and contrasting 2-D and 3-D shapes, identifying their properties.



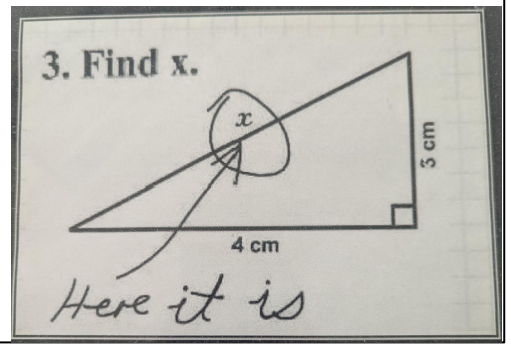
SMP

1. Present students with an image of a cube and an image of a square and ask them what they notice and what they wonder about the shapes.
2. Leverage this math talk as a classroom with a focus on thinking and sharing ideas, using hand signals to indicate ideas/insights, with emphasis on math vocabulary.
3. Collaboratively construct knowledge about 2-D and 3-D shapes.

Traditional vs. SMP (Secondary)

Traditional

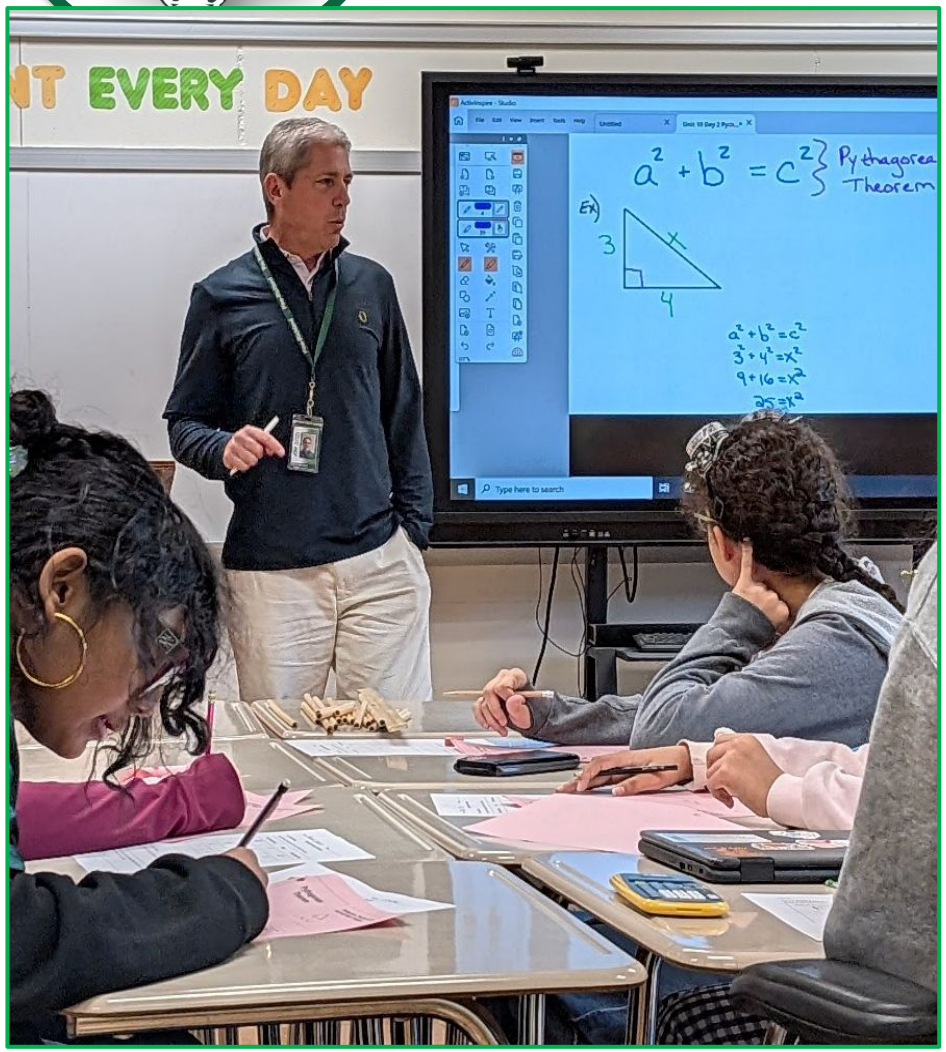
1. Identify properties of a Right Triangle.
2. Introduce Pythagorean Theorem.
3. Model examples of solving for sides a, b, and c.
4. Provide students with time to practice.



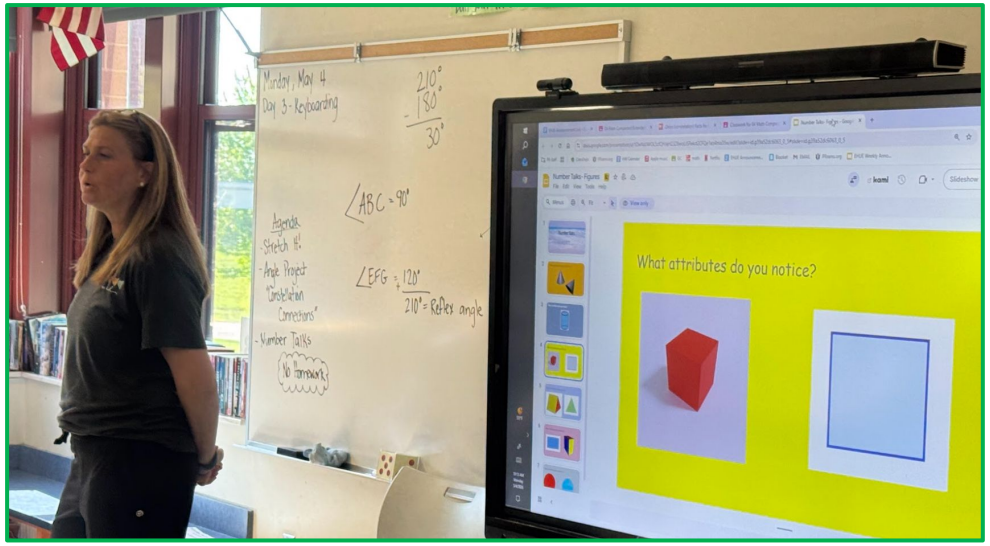
SMP

1. Give students math rods of varying lengths with a goal of creating different sized right angles.
2. Identify patterns in lengths of each side (e.g. 3 in., 4 in., 5 in.).
3. Group discussions identifying patterns using math vocabulary (formula).
4. Apply the pattern formula to solve a real-world problem.

Sense-Making Culture with Students Thinking











"Focus on learning for every student every day."

702 WARRENDALE RD., GIBSONIA, PA 15044



Recommendation #2: Instruction

Use instructional routines and high-cognitive-demand tasks in the math classroom that explicitly embed the standards for mathematical practice to foster mathematical thinking, sense-making, math discourse, productive struggle, and reasoning.

Create a culture of sense-making that reinforces and focuses class time on mathematical thinking, multiple solution strategies and learning modes (visual, auditory, kinesthetic, and tactile), and use of mathematical academic vocabulary, as opposed to a culture of “quick answer getting”, so that all students can see themselves as successful mathematicians who can engage with new or novel math scenarios.

PINE-RICHLAND SCHOOL DISTRICT

Rec #2: Instruction

K-12

Grades K-12

1. Use the classroom to support all Standards for Mathematical Practice (e.g., tools, anchor charts, flexible furniture set-up, visual displays, "ask yourself questions", annotation examples, sentence frames/starters, "Four Rs chart - repeat, rephrase reword, record").
2. Ensure that math tasks used in class have a "low floor" and "high ceiling" to appeal to learners across the spectrum of readiness and needs, where the task can be simplified or enriched to scaffold their thinking and yield success.
3. Leverage instructional routines that follow the sequence designed by Kelemanik, et al (2016): "(1) articulation of a math practice goal; (2) individual think time; (3) partner work; (4) full-group discussion of idea; (5) final math practice reflection; (6) access through multiple modalities and multiple representations; and (7) liberal use of math practice-focused prompts".

****Images from Kelemanik, et al, (2016)*

"I noticed/wonder_____"

"The difference between the two is _____"

"When [Student] said _____ it made me think _____"

"I agree/disagree with you because _____"

"So I hear you saying that _____"

"To add on_____"

"What would happen if_____"

The Four Rs Strategy

Teacher Question and Decision Point	Action to Take
First, ask yourself: *Did all my students hear the idea?*	If not, then *repeat*: Call on a student to repeat what was said.
Next, ask yourself: *Did all my students understand the idea?*	If not, then *rephrase*: Call on one or two students to rephrase what was said. Rephrasing involves saying the idea again using different words. This provides additional processing time for those who need it, additional practice communicating for the speaker, and additional opportunity to make sense of the language for those students who need it.
Next, ask yourself: *Is now the time to press for precision in language?*	*If yes, then reword*: Say the idea again, substituting any mathematical or academic language that you want to have your students develop.
Finally, ask yourself: *What do I need to capture in the language and the thinking for reference by my students?*	*Record*: Publicly write down some record of the idea, using language you want students to use.

Rec #2: Instruction

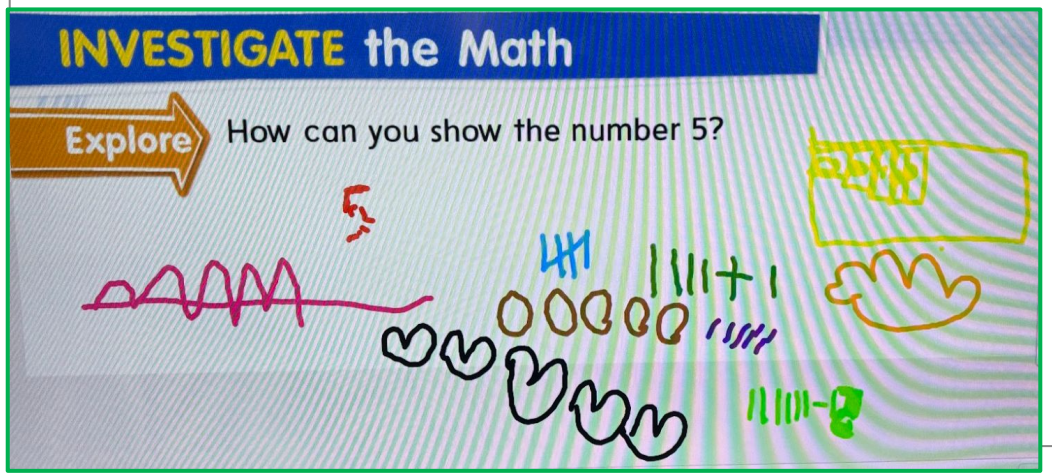
Elementary

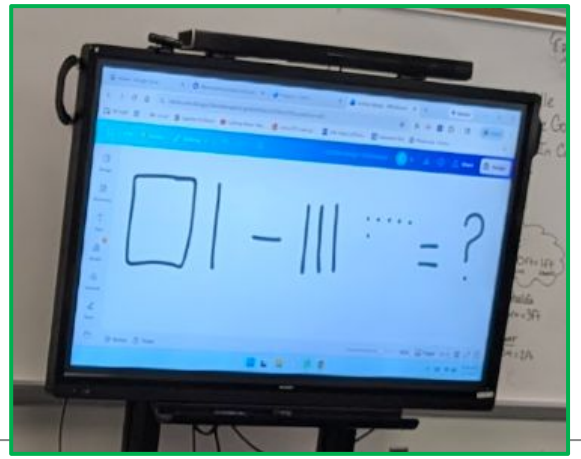
Grades K-6

1. Intentional planning for instructional time to differentiate instruction and permit flexible grouping across classrooms during Tier 1 class time and RAM time (across the biome or grade level if applicable).

2. Identify best practices through MTSS to support kids needing Tier 2 or 3 intervention within core time, recognizing the pull on RAM between reading and math interventions with consideration for the transition back from Tier 3 to Tier 2 with enough support.

3. Focus on a balance of fluency and rigor emphasizing systematic vocabulary instruction to help all students navigate "word-heavy" math.







Rec #2: Instruction

Secondary

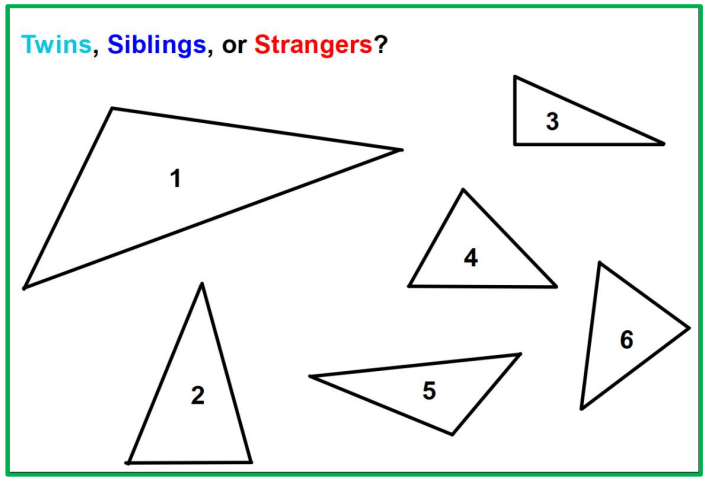
Grades 7-8

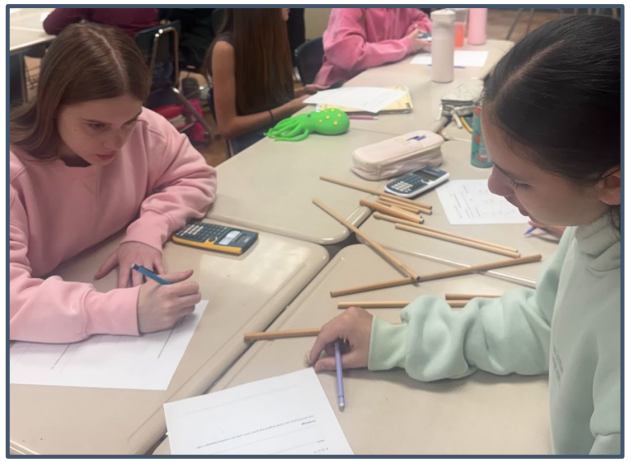
1. **Intentional planning for Academic Support** within the team and department guided by assessment analysis (unit, common, benchmark, and diagnostic assessments).

Grades 9-12

1. Adjust lessons to include more opportunities for students to engage in **sustained mathematical reasoning and discourse** which require students to explore and to understand the nature of mathematical concepts, processes, or relationships.









Recommendation #3: Curriculum

Modify the structure of Unit Based Curriculum to integrate the Standards for Mathematical Practice (SMP) into units of study, with columns added to the written curriculum to designate which of the 8 SMP are being emphasized in each unit.

Rec #3: Curriculum

All Grades

1. Create and **link the high-cognitive-demand mathematical tasks** into each unit as common elements of the curricular framework for a given unit and course.

2. Use historical trends in student performance and data analysis to **highlight those areas of need within the unit-based curriculum** (e.g., AAGR and STAR).

Secondary

Grades 9-12

1. Review and refine the Geometry curriculum to ensure it effectively supports student preparation for Algebra 2 while providing targeted reinforcement for those who need to retake the Algebra Keystone Exam.

Solving real-world problems using numeric and algebraic equations should continue to be an area of focus. This will include positive and negative rational numbers (numbers that can be expressed as a fraction). Additionally, students need to improve their skills in problem solving (translating a story (problem) into a mathematical equation).
Interpreting data to make predictions or draw inferences is an area where our students have struggled. Although not heavily weighted in the assessment, it continues to be an area of opportunity.

Academic Achievement and Growth Report Example

Rec #3: Curriculum - K-12 Math Tasks

Low Cognitive Demand

Find the mean of the data set.

{9, 10, 8, 4, 6, 2}

Moderate Cognitive Demand

Find two different sets of six data points that both have a mean of 6.5.

High Cognitive Demand

Provide students with the average age of all large dogs and average age of all small dogs at a Doggie Daycare. Ask students to find the average age of all dogs.



Recommendation #4: Assessments

Further integrate common, benchmark, and classroom-based assessments (e.g., unit, pre-assessments, Midterm/Final Exams, Firefly, and STAR) to guide instructional decisions (e.g., flexible grouping, pacing, extension, and re-teaching).

Use assessment data, including students' progress in the development of their thinking through the Standards for Mathematical Practice in the student attributes rubric, for individualized goal setting and instructional planning.

Rec #4: Assessments

Grades K-12

1. Build in opportunities for student feedback in alignment with the Standards for Math Practice using the student attribute rubrics regularly throughout the school year and include them in the Student Information System as common assessments for identification of strengths, opportunities, and trends across various levels of analysis.

Grades K-3

1. Common assessments at each grade level, including consideration for pre-assessments as recommended in the Gifted and/or Highly Achieving IDPR, and use of classroom-based assessments to guide grouping for the classroom and RAM time for differentiated learning opportunities based on students' needs.

2. Analyze test results as a team to ensure alignment among classrooms to maximize best practices and leverage all team members to differentiate across classrooms with flexible grouping.

Grades 4-6

1. Common Assessments at each grade level with selected use of pre-assessments with some student groups where appropriate (e.g., compacted/extended).

Rec #4: Assessments

Grades 7-12

1. Clarify department-wide grading expectations (Academic, Honors, AP) that clearly define the weighting of classwork, homework, and assessments to ensure consistency and transparency (syllabus).

2. Integrate classroom assessment data into pathway and course recommendations (in place of or in addition to, grade averages).

Math Placement Matrix Factor Sheet

	2nd to 3rd	3rd to 4th	4th to 5th	5th to 6th	6th to 7th	7th to 8th	9th-12th
40%	20% **(MXCBM)** My Math Cumulative Benchmark 20% **(MXDPL)** Diagnostic Placement Test Grade 3	20% **(MXBMM)** My Math Cumulative Benchmark 20% **(MXDPL)** Diagnostic Placement Grade 4	15% **(MXBMM)** My Math Cumulative Benchmark Grade 4 15% **(MXDPL)** Diagnostic Placement Grade 5 10% PSSA Grade 3	15% **(MXBMM)** My Math Cumulative Benchmark Grade 5 15% **(MXDPL)** Diagnostic Placement Grade 6 10% PSSA Grade 4	**PVAAS** Prob ADV on Math for Gr 6 PSSA 40%	**PVAAS** Prob ADV on Math for Gr 7 PSSA 40%	100% - Previous End-of-Course Grade and Teacher Recommendation
20%	My Math Chapter Tests at Proficient (P) Level **(MXMMA)**	Average % Q1, Q2, Q3 **(EO3MAVG)**	Average % Q1, Q2, Q3 **(EO3MAVG)**	Average % Q1, Q2, Q3 **(EO3MAVG)**	Average % Q1 & Q2 30%	End of Year Q1, Q2, M 30%	
20%	STAR 360	STAR 360	STAR 360	STAR 360	STAR 360 20%	STAR 360 20%	
10%	Student Attribute **(MXTAT)**	Student Attribute **(MXTAT)**	Student Attribute **(MXTAT)**	Student Attribute **(MXTAT)**	Student Attribute 10% **(MXTAT)**	Student Attribute 10% **(MXTAT)**	
(New) 10%	Basic Math Facts **(MXBMA)**	Basic Math Facts **(MXBMA)**	Basic Math Facts **(MXBMA)**	Basic Math Facts **(MXBMA)**			



Recommendation #5: Math Pathways

Engage in grade-level and course-specific recommendations to refine the math pathways and experience K-12 to support all students.

Rec #5: Math Pathways

Elementary

Grades K-3

1. Provide opportunities in the core block for appropriate differentiation to meet students' needs with reinforcement of learning and enrichment within Current, Compact & Extended, or Accelerated, as well as pull-out interventions or enrichment during RAM Time.
2. Intentionally schedule co-teaching in Grade 3 to support data-based intervention within Tier 1, Current math class as needed.

Grades 4-6

1. Within the MTSS system, ensure time for math intervention with qualifying students, given the priority currently given to ELA support (Tier 2 or Tier 3).

PRSD Math Pathways

K	1	2	3	4	5	6	7	8	9	10	11	12
Course Level Determination				Course Acceleration								
				Math (5th)	Math (6th)	Pre-Alg	Hon.Alg 1	Hon.Geo	Hon.Alg2 ≥90% in Alg.1	Hon.TIA ≥90% in Geo/Alg.2 ≥80% in Hn.Geo/Hn.Al2	APCalcAB ≥90% in AA&T ≥80% in Hon.TIA APCalcBC ≥90% in Hon.TIA APStats ≥90% in AA&T ≥80% in Hon.TIA	APCalcAB ≥90% in AA&T ≥80% in Hon.TIA APCalcBC ≥90% in Hon.TIA APStats ≥90% in AA&T ≥80% in Hon.TIA
Math K	Math 1	Math 2	Compacted/Extended Pathway									
			Math 3	Math 4	Math 5	Math 6	Pre-AI	Algebra1	Hon.Geo ≥90% in Alg. 1	Hon.Alg2 ≥90% in Alg.1	Hon.Pre-Calc ≥90% in Alg.2 OR ≥80% in Hn.Al2	CHSBusCalc ≥80% in Trig APCalcAB ≥90% in AA&T ≥80% in Hon.TIA APCalcBC ≥90% in Hon.TIA APStats ≥90% in AA&T ≥80% in Hon.TIA
			Current Pathway									
			Math 3	Math 4	Math 5	Math6	Pre-AI	Algebra1	Geometry Alg. 1	Alg2 Alg. 1 & Geom. Or Concurrent w/ Geom.	Pre-Calculus >=80% Alg. 2 or >=70% H.Alg. 2 OR Trig. & Anal. Geom. Geom. & Alg. 2 OR Stats *complete Alg2	CHSBusCalc ≥80% in Trig or BusCalc ≥80% in Trig or Stats *complete Alg2
									Algebra 1	Geometry Alg. 1	Alg2 Alg. 1 & Geom. Or Concurrent w/ Geom.	Pre-Calculus >=80% Alg. 2 or >=70% H.Alg. 2 OR Trig. & Anal. Geom. Geom. & Alg. 2 OR Stats *complete Alg2
							Fund. of Pre-AI	Fund. of Alg. I	Algebra I w/Lab	Geo w/ Lab ≤80% in Alg1	Alg2 w/ Lab Alg. 1 & Geom. Or Concurrent w/ Geom.	

Rec #5: Math Pathways

Secondary

Grades 7-8

1. Review math matrix data to determine other data points to consider in making course recommendations that more tightly align to course-level requirements. This may include pathway modifications.

Grades 9-12

1. Conduct a comprehensive review and refine the high school mathematics pathways (Grades 9-12) to ensure alignment with student needs.
   - Upper pathway options (e.g., AP Linear Algebra, CHS Pre Calculus);
   - Assess the impact of the current lab course design and instructional model (Algebra I, Geometry, and Algebra II);
   - Identify needs for lower pathway options for non-Algebra and non-Algebra 2 students; and
   - Refine the current pathway and/or courses for students in vocational programs (e.g., Math in the Workplace).

PRSD Math Pathways

K	1	2	3	4	5	6	7	8	9	10	11	12
Course Level Determination				**Course Acceleration**								
				Math (5th)	Math (6th)	Pre-Alg	Hon.Alg 1	Hon.Geo	Hon.Alg2 ≥90% in Alg.1	Hon.TIA ≥90% in Geo/Alg.2 ≥80% in Hn.Geo/Hn.Al2	APCalcAB ≥90% in AA&T ≥80% in Hon.TIA APCalcBC ≥90% in Hon.TIA APStats ≥90% in AA&T ≥80% in Hon.TIA	APCalcAB ≥90% in AA&T ≥80% in Hon.TIA APCalcBC ≥90% in Hon.TIA APStats ≥90% in AA&T ≥80% in Hon.TIA
				Compacted/Extended Pathway								
Math K	Math 1	Math 2	Math 3	Math 4	Math 5	Math 6	Pre-Al	Algebra1	Hon.Geo ≥90% in Alg. 1	Hon.Alg2 ≥90% in Alg.1	Hon.Pre-Calc ≥90% in Alg.2 OR ≥80% in Hn.Al2	CHSBusCalc ≥80% in Trig APCalcAB ≥90% in AA&T ≥80% in Hon.TIA APCalcBC ≥90% in Hon.TIA APStats ≥90% in AA&T ≥80% in Hon.TIA
				Current Pathway								
			Math 3	Math 4	Math 5	Math6	Pre-Al	Algebra1	Geometry Alg. 1	Alg2 Alg. 1 & Geom. Or Concurrent w/ Geom.	Pre-Calculus >=80% Alg. 2 or >=70% H.Alg. 2 OR Trig. & Anal. Geom. Geom. & Alg. 2 OR Stats *complete Alg2	CHSBusCalc ≥80% in Trig or BusCalc ≥80% in Trig or Stats *complete Alg2
									Algebra 1	Geometry Alg. 1	Alg2 Alg. 1 & Geom. Or Concurrent w/ Geom.	Pre-Calculus >=80% Alg. 2 or >=70% H.Alg. 2 OR Trig. & Anal. Geom. Geom. & Alg. 2 OR Stats *complete Alg2
							Fund. of Pre-Al	Fund. of Alg. I	Algebra I w/Lab	Geo w/ Lab ≤80% in Alg1	Alg2 w/ Lab Alg. 1 & Geom. Or Concurrent w/ Geom.	





Recommendation #6: Resources

Establish and implement dedicated professional development to ensure all mathematics teachers are proficient in utilizing the digital platforms and online instructional resources associated with purchased texts, including existing supplemental programs (e.g., Freckle, Amplify, ALEKS).

Rec #6: Resources

All Grades

Grades K-12

1. Establish and implement dedicated professional development to ensure all mathematics teachers are proficient in utilizing the digital platforms and online instructional resources associated with purchased texts, including existing supplemental programs (e.g., Freckle, Amplify, ALEKS).

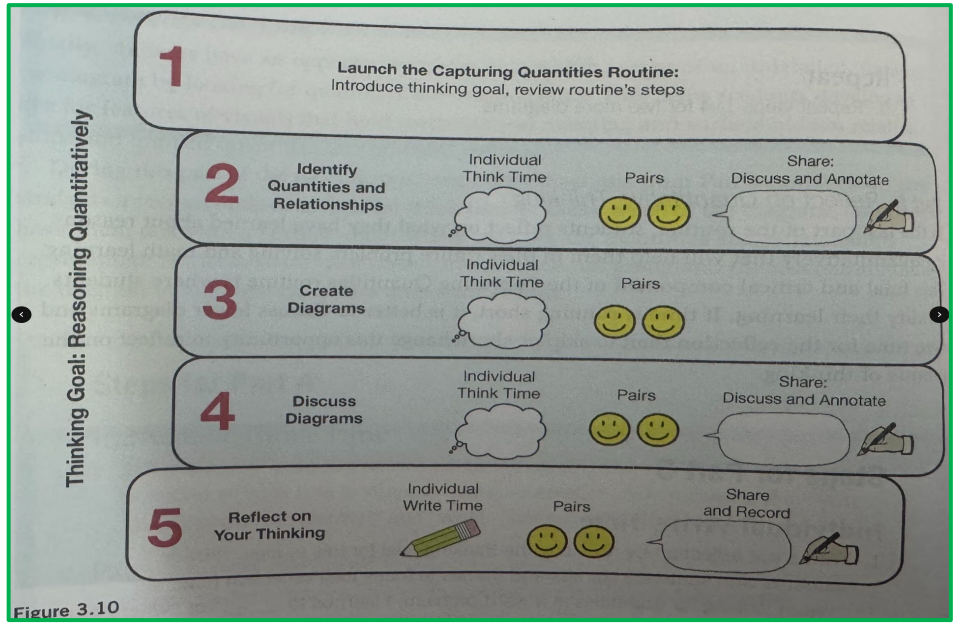


Image from Kelemanik, et. al., 2016

Elementary

Grades K-5

1. Evaluate and purchase rigorous curricular resources during the 2026-2027 resource review for K-5 mathematics that aligns with both the PA standards and fosters the Standards for Mathematical Practice, intentionally.

Primary Resources:
My Math, McGraw-Hill (2018)
Secondary Resources (District Approved):
Computer-Adaptive Resources: • Standards-Aligned Application & Assessment: RedBird, McGraw-Hill • Basic Facts Practice & STAR 360 Aligned Freckle Math, Renaissance



Timeline for Implementation

2026-2027

1. K-12 Deepen integration of Standards for Math Practice (Syllabi and Lesson Plans) [Vision, Instruction]
2. K-5 Resource Evaluation [Instruction, Resources]
3. Math Matrix Revisions - Secondary [Assessments, Math Pathways]
4. Lower Pathway Development - PRHS [Curriculum, Assessments, Vision, Math Pathways]

2027-2028

1. K-12 Deepen integration of Standards for Math Practice (Standards for Mathematical Practice and Math Tasks Embedded in UBC Classroom Design, Assessments) [Vision, Instruction, Curriculum]
2. K-5 Resource Implementation [Resources, Instruction, Vision]
3. Upper Pathway Development - PRHS [Curriculum, Assessments, Math Pathways]
4. Math Matrix Update Integration [Assessments, Math Pathways]
5. Tailored professional development based current or new resources to support instruction and assessment analysis [Instruction, Assessments, Resources]

2028-2029

1. K-12 Deepen integration of Standards for Math Practice (Instructional Focus, Differentiation Supervision) [Vision, Instruction, Curriculum]
2. K-12 Common Assessment Updates Integration [Assessments, Instruction, Curriculum]
3. K-5 MTSS [Assessments, Instruction]
4. Course Offering Updates Implementation Year [Assessments, Curriculum, Resources, Math Pathways]
5. Continue tailored professional development based current or new resources to support instruction and assessment analysis [Instruction, Assessments, Resources]

PINE-RICHLAND SCHOOL DISTRICT

Discussion/Reflections

The 8 Standards for Math Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
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