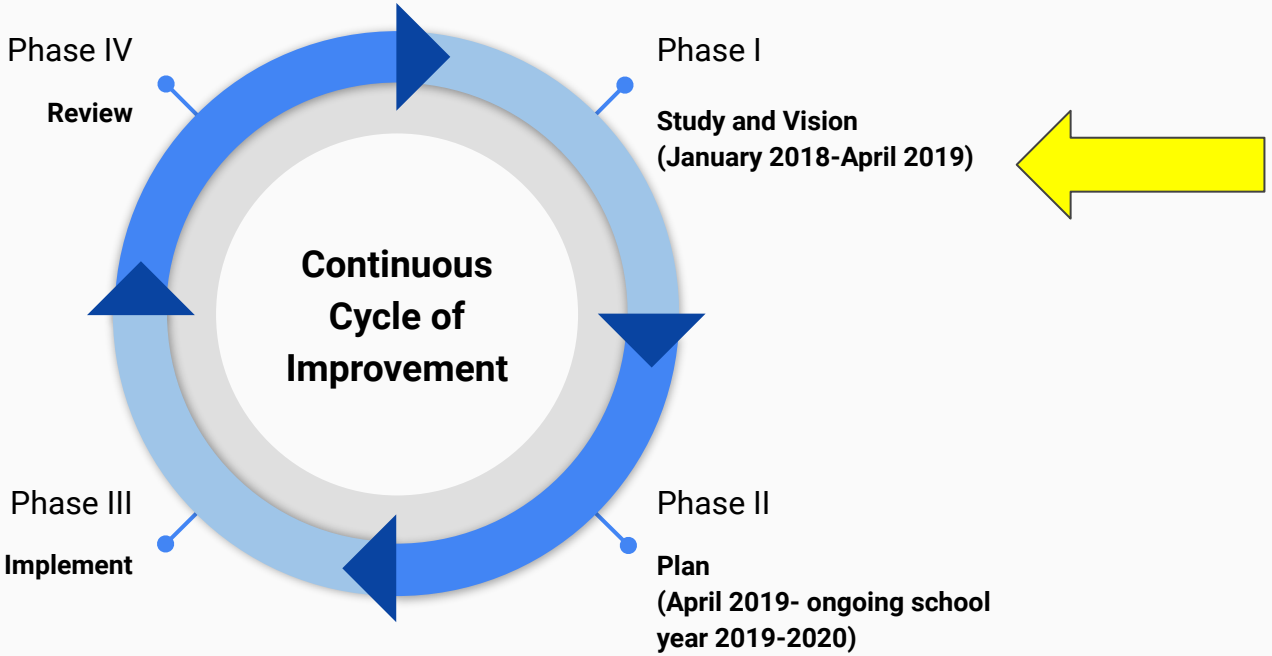
K-5 Math Curriculum Recommendation

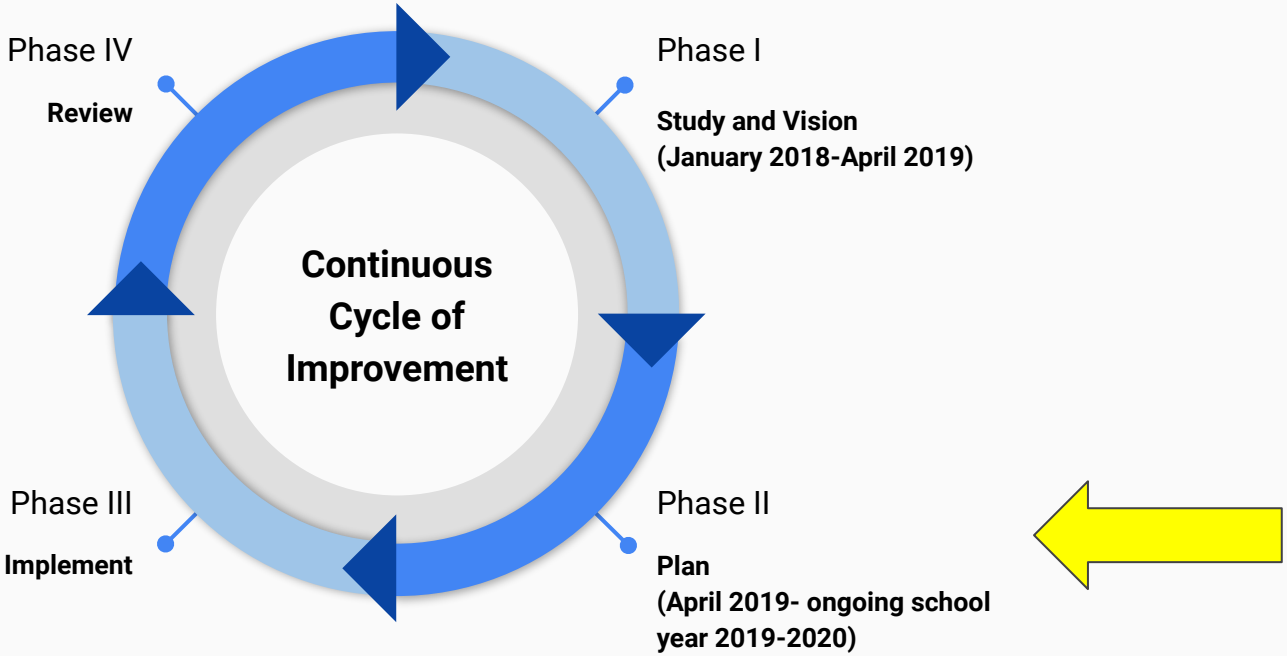
Presentation to Curriculum Subcommittee
5/11/20

Math Program Review Process

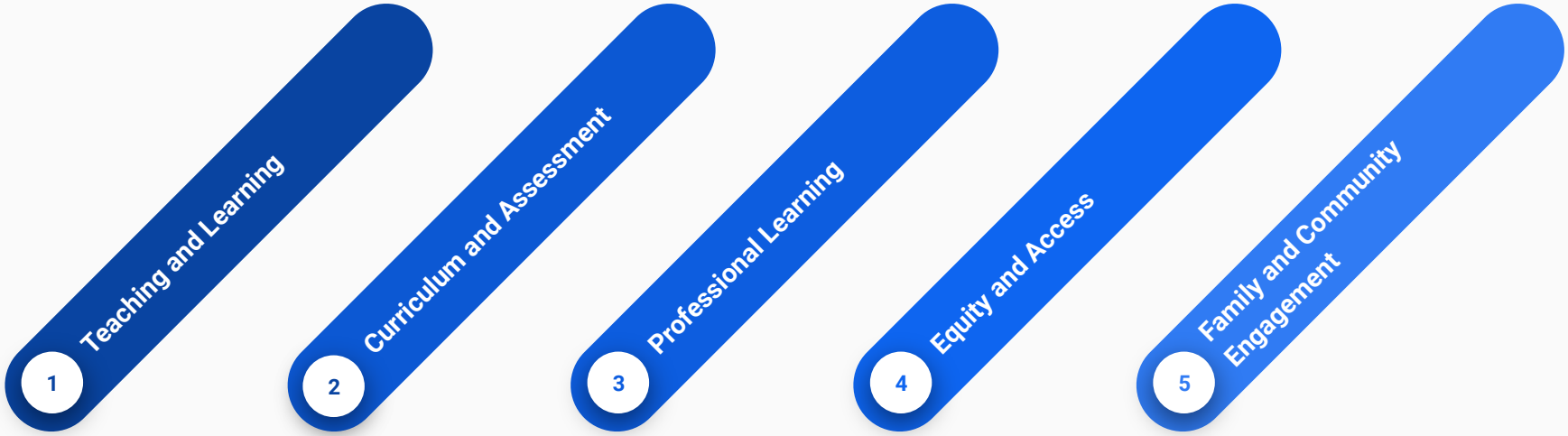


Phase 1 - Study and Vision

Math Program Review Process

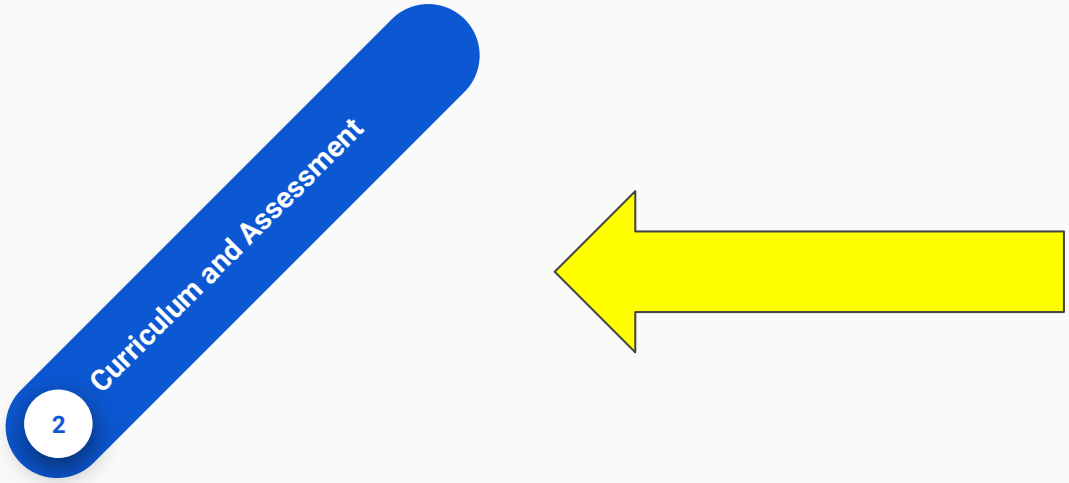


PSB K-8 Math Department Strategic Priorities



Key Actions	2019-2020	2020-2021	2021-2022
Build an understanding of Effective Mathematical Teaching Practices for teachers, administrators and evaluators	Ongoing through new curriculum, pilots, and specialists		
Implement new 6-8 curriculum with ongoing PD (summer, job-embedded, department meetings)			
Pilot and recommend K-5 curriculum aligned with PSB criteria			
Provide content PD for K-5 teachers	grades 3-5	new teachers 3-5 grades K-2	new teachers K-5
Implement new K-5 curriculum with ongoing PD (summer, job-embedded, workshops)		All grades 3-5; new teachers and possible opt-in K-2?	All grades K-5
Provide parent information sessions and workshops	Through PTO coffees; parent series at Lincoln	School-based or district-wide parent series connected with K-5 curriculum	

PSB K-8 Math Department Strategic Priorities



K-5 Math Materials Review Process 2018-2020

Sept. 2018 -Jan. 2019
Part I – Identification of K-5 Materials for Review

- Identify materials used nationally and locally
- Review current research on the effectiveness of the materials
- Review alignment to state standards and Brookline Learning Expectations
- Document the reasons for pursuing some materials for deeper review by a materials review committee
- Create a template for review of materials with the committee

Jan. 2019-June 2019; Dec. 2019-March 2020

Part II - Review of K-5 Math Materials

- **Create a K-5 Materials Review Committee**
  - Kathleen Hubbard - K-8 Math Coordinator
  - Julie Boss - District-wide Math Specialist
  - Norma Gordon - District-wide Coach
  - Alison Hansel - Math Specialist, Pierce
  - *Kerrilyn McCarthy - ETF Pierce (year 1 only)*
  - Liz Exton - Kindergarten, Lawrence
  - Laura Richardson - Grade 1, Baker
  - Jenny Yee - Grade 1, Pierce
  - Karen Shashoua - Grade 2, Heath
  - Marian Voros - Grade 2, Runkle
  - Dave Carter - Grade 3, Pierce
  - Bianca Medina - Grade 4, Driscoll
  - Jen Keeler - Grade 4, Baker
  - Kelly Gartside - Grade 4, Baker
  - Viri Hawkins - Grade 5 Driscoll
  - *Noorjehan Kahn - Grade 5, Heath (year 1 only)*

Part II - continued

- **Present the template for review and the process**

  Criteria were developed in conjunction with focus areas from Program Review:

  - Assessment
  - Access and Equity
  - Teaching and Learning (Effective Math Teaching Practices)
  - Implementation and Ease of Use
  - Mathematical Practice Standards
  - Curriculum
  - Tools and Technology
  - Professional Development

Selected programs for pilot

Illustrative Math (IM) - Rationale: This program is written by one of the writers of the Common Core Standards, and has instructional routines embedded that align with the work we have been doing around research based NCTM Effective Math Teaching Practices. The design principles include “three overarching and interconnected principles—learning, teaching, and equity” and the materials address student development “in all three aspects of rigor as driven by the standards themselves: conceptual understanding, procedural fluency, and application.” We are implementing IM in grades 6-8, and If this program were selected we would have a common program and approach K-8 in PSB.

Investigations 3 -Rationale: The philosophy and instructional approach in *Investigations 3* aligns with the approach of the curriculum being piloted in grades 6-8. “Fully aligned to the content and practice standards of the Common Core State Standards (CCSS), deep and careful attention is paid to mathematics content and to student thinking and understanding. Making sense of mathematics is the heart of the work, for students and teachers.” Of the 3 programs reviewed with the PSB K-5 Math criteria developed in alignment with program Review visioning work, this curriculum had the highest average total points in all categories.

Pilots by School

	Baker	Coolidge Corner	Driscoll	Heath	Lawrence	Lincoln	Pierce	Runkle
K								
1								
2								
3								
4								
5								

KEY: PURPLE = ILLUSTRATIVE MATHEMATICS
BLUE = INVESTIGATIONS 3

Pilot School Year 2019-2020

- Summer Launch
- Optional pilot check-in meetings after school
- Feedback collected through teachers and specialists: end of unit surveys, meetings with teams and individual teachers, criteria review
- Student work samples collected
- Classroom visits
- PTO coffees - parent updates and input

K-5 Materials Review Meetings 2019-2020

Thursday 12/19/19	Feedback on Pilot Curricula
Thursday 1/16/20	Criteria Review of Illustrative Math K-5
Thursday 2/27/20	Reviewing Feedback to date to inform recommendation

Recommendation of Investigations as Foundational K-5 Curriculum

based on information collected and additional Committee considerations

Does the curriculum engage students and foster a love of mathematics?
Does curriculum reach all types of learners?

Timing and Process - published vs. pilot/OER

Professional Development - what is embedded, what is needed, what supports do we have in place?

Readiness of Materials for Teacher use (6-8 content teachers vs. K-5 classroom teachers)

Overall Findings: Some Key Strengths in Investigations 3

- Depth of student understanding:
  - fluency with math facts, use of various models, ability to apply
  - Students are recording and explaining thinking in impressive ways. Discussion leads to deeper understanding being reflected in written responses
- Embedded Professional Development (printed materials, videos, examples of student thinking/responses)
- Resources for teachers and families: print and online; pilot teachers report that resources for teachers are thoughtful and helpful
- Student-centered approach; developing conceptual understanding followed by procedural fluency; teachers report that investigations are deep and enjoyable for both students and teachers
- Ongoing assessments provide information throughout units (assessment - learning about student thinking)

Overall Findings: Areas to Address

- Additional time/resources for support and extension (WIN blocks were important for addressing this)
- “Ten minute math” is an essential component and can be challenging to schedule
- Need to supplement in some areas (i.e., some fraction concepts in grades 3 and 4)
- Supporting families in understanding the approach - parent workshops
- Collaboration time for teachers to plan and reflect on student work together
- Assessment - difference between those embedded by Terc and those added by Pearson

Sample quotes from teachers

“The lessons are clearly planned out. The materials are clearly planned and easy to use. The combination of discussions and hands-on math application is well thought out and sequential. Students are enjoying the curriculum and get excited for math.” (Kindergarten)

“This curriculum offers some wonderful resources (online tools, online lesson plan book, EL suggestions, differentiation suggestions) that support teachers in making good choices for their students and for the ease of using this program." (Grade 1)

“While we recognize any program will have growing pains, my kids and I have REALLY enjoyed using this curriculum! It has brought out some deep thinking in our kids around looking for patterns and connections across numbers and defending your problem solving and explaining your strategies. I am seeing clear growth in mathematical arguments, fluency, and problem solving strategies. ” (Grade 2)

Sample quotes from teachers (cont.):

“This curriculum is really giving me insight into my students thinking. It is providing them with various strategies to use and the discussions allow the students to share their thinking. Each lesson really seems to build on previous lessons which gives students repeated exposure.” (Grade 3)

“This curriculum is thoughtful, developmentally appropriate, and involves rich thinking for students. It pushes for deep understanding of concepts and encourages them to discuss, justify their thinking, and develop visual representations for their ideas. It's also clearly based on NCTM's Effective Mathematics Teaching Practices.” (Grade 4)

“The curriculum has encouraged rich mathematical conversations in my classroom and encouraged students to try a variety of approaches to problem-solving. I appreciate the easy-to-follow lessons and the professional development sections included in the guide.” (Grade 5)

Next Steps

K-5 Math Rollout Planning		
What	**When**	**Who**
Implementation Launch PD for grades 3-5	Terc PD (June, July, August) PSB PD - ongoing	Teachers, Math specialists, and special educators in grades 3-5 Opt-in for K-2 teams
Implementation support for math specialists throughout the year	Terc - 8 three hour sessions from October through May	Math Specialists
Ongoing teacher PD and support - Building-based or partner Math Learning Labs	4 half days throughout the school year per teacher per grade level	Math PLCs - for classroom teachers, special educators and math specialists