



Pocantico Hills School Math Instructional Update

January 24, 2019

Adam Brown, Director of Curriculum and Technology, CIO

Peggy Golden, Consultant

Emma Goodman, 5th Grade Teacher

Michelle Fitzpatrick, 1st Grade Teacher

Personalized Professional Development with Peggy Golden

- August 29 (Superintendent Conference Day)
- October 5 Grades 1, 2, 3, 4
- October 12 Grades PK, K, 5, 6
- November 14 Grades PK, K, 1, 2
- November 15 (weather-shortened) Grades 4, 5, 6
- December 5 (weather make-up) Grade 3
- December 6 Grades 4, 7
- January 10 Grades PK, K, 1, 2
- January 11 Grades 3, 4, 5, 6

1st Semester: In addition to the August Superintendent Conference Day, each grade-level team PK-6 has had at least three personalized 1½-hour sessions

Develop math units of instruction and teacher proficiency in making conceptual connections and designing student-centered lessons

2017-2018

Focus: Building Capacity - Middle School Content, Pedagogy, and Instruction

- Build content expertise
- Expand instructional practices
- Design lessons
- Identify anchor problems and develop centers
- Identify opportunities to reorganize scopes and sequences
- Build awareness of Next Generation Mathematics Learning Standards (as per NYSED)

2018-2019

Focus: Designing Lessons/Units and Building Capacity - K-8 Content, Pedagogy, and Instruction

- Build content expertise and awareness of conceptual approach in contiguous grades
- Model instructional practices in support of a student-centered model
- Develop curriculum units K-8
- Align instructional practices across grade levels
- Develop formative assessments aligned to the instructional pedagogy and State assessments
- Build capacity around Learning Standards (as per NYSED)

2019-2020

Focus: Continuing Lesson/Unit Design, Instructional Coaching, and Capacity Building

- Refine math curriculum units
- Strengthen practice through instructional coaching to support the workshop model and the Singapore methodology
- Build capacity around Learning Standards (as per NYSED)

SUMMER 2020

THREE-YEAR
BENCHMARK DATA
POINT

Large scale review of progress toward long term goals

Adjustment & refinement of priorities



2018-2019

Through the first four months, we have spent the most time focusing on the highlighted action items.

***Focus: Designing Lessons/Units and Building Capacity
- K-8 Content, Pedagogy, and Instruction***

- **Build content expertise and awareness of conceptual approach in contiguous grades**
- **Model instructional practices in support of a student-centered model**
- **Align instructional practices across grade levels**
- **Build capacity around Next Generation Learning Standards (as per NYSED)**
- Develop curriculum units K-8
- Develop formative assessments aligned to the instructional pedagogy and State assessments

Build content expertise and awareness of conceptual approach in contiguous grades

- Teachers analyze how skills and strategies in the Standards evolve and are applied consistently across the grade levels.
 - “Make a Ten” strategy in grades 1-5

The “make a ten” strategy:
note how 4 is decomposed as 1 and 3 in order to make a ten,
i.e., $9 + 1 + 3 = 10 + 3$.

$$\begin{array}{r} 87 \\ \swarrow \searrow \\ 80 \quad 7 \end{array} + \begin{array}{r} 5 \\ \swarrow \searrow \\ 3 \quad 2 \end{array} = 92$$



Build content expertise and awareness of conceptual approach in contiguous grades

$$1\frac{1}{2} + \frac{5}{8}$$

“Traditional”

$$\begin{aligned} &1\frac{1}{2} + \frac{5}{8} \\ &= \frac{3}{2} + \frac{5}{8} \\ &= \frac{12}{8} + \frac{5}{8} \\ &= \frac{17}{8} \\ &= 2\frac{1}{8} \end{aligned}$$

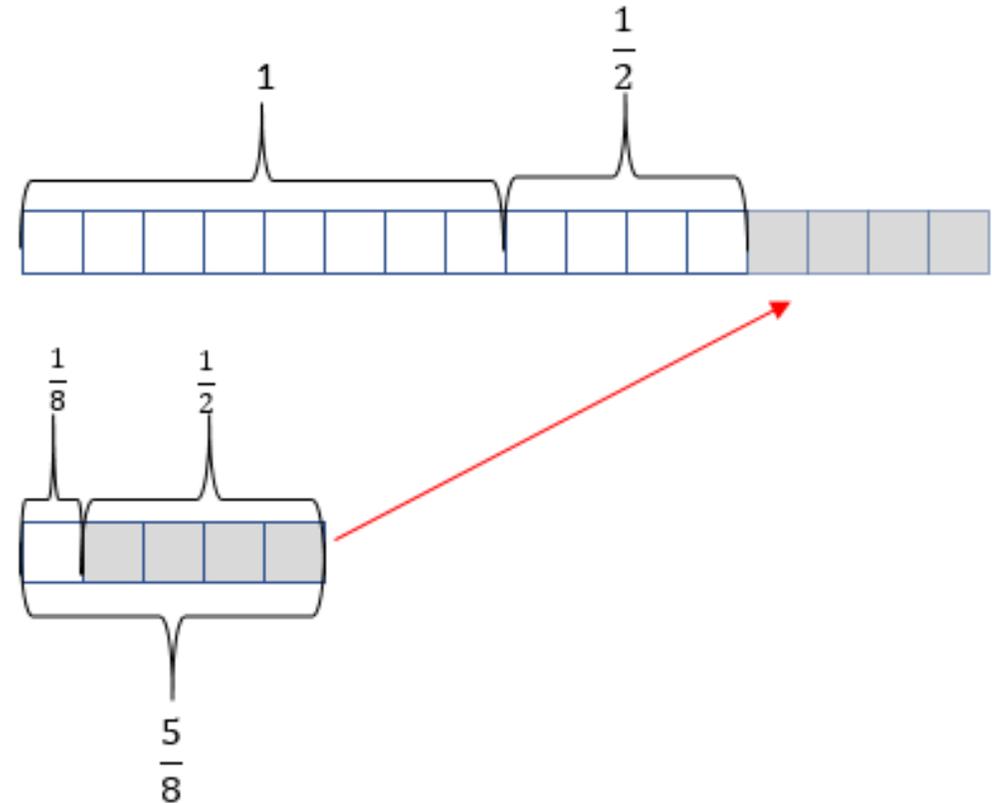
Make the Next 1

$$1\frac{1}{2} + \frac{5}{8}$$

(Note: In the original image, a red circle highlights the $1\frac{1}{2}$ term, and a bracket connects the $\frac{5}{8}$ term to a $\frac{1}{8}$ term below it, which is added to the $\frac{1}{2}$ term of the mixed number.)

$$1\frac{1}{2} + \frac{1}{2} = 2$$

$$2 + \frac{1}{8} = 2\frac{1}{8}$$



Model instructional practices in support of a student-centered model

MC15 (Correct Resp: D)	MC16 (Correct Resp: A)
D	B
C	C
D	C
D	B
D	B
D	A
D	A
D	C
C	A
D	

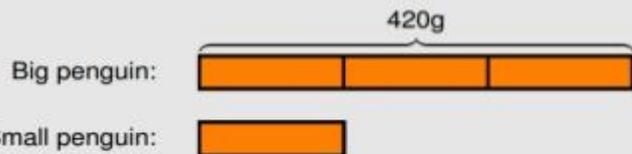
Number and Operations in Base Ten	MC11	78%	-9%
	MC27	91%	8%
Operations and Algebraic Thinking	MC06	100%	8%
	35	78%	-12%

- Teachers use the Next Generation Learning Standards to develop differentiated centers that support fluency and conceptual understanding through games, open-ended tasks or word problems, computer programs, or teacher modeling
- Teams use assessment data analysis to identify misconceptions and determine topics for centers and mini-lessons
- Teams share logistical strategies for centers with each other and observe colleagues' classrooms
- Consultant models instructional strategies that strengthen conceptual understanding

Align instructional practices across grade levels

A tape diagram used to solve a Compare problem

A big penguin will eat 3 times as much fish as a small penguin. The big penguin will eat 420 grams of fish. All together, how much will the two penguins eat?



B = number of grams the big penguin eats
 S = number of grams the small penguin eats

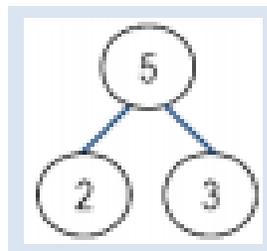
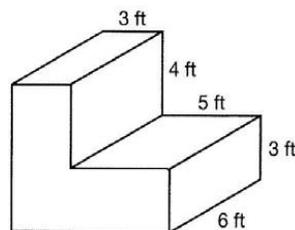
$$3 \cdot S = B$$

$$3 \cdot S = 420$$

$$S = 140$$

$$S + B = 140 + 420$$

$$= 560$$



- Teams analyze how a strategy in one grade applies to a different concept in another grade

Unit Form

$$20 \times 30$$

$$= 2 \text{ tens} \times 3 \text{ tens}$$

$$= 6 \text{ hundreds}$$

$$= 600$$

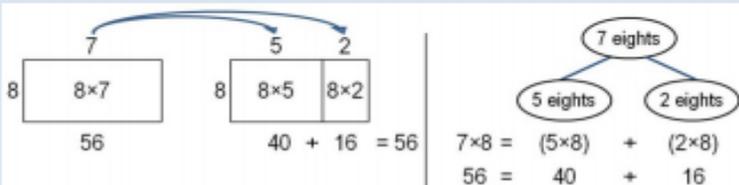
$$0.2 \times 0.03$$

$$= 3 \text{ tenths} \times 3 \text{ hundredths}$$

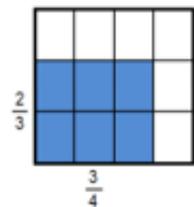
$$= 6 \text{ thousandths}$$

$$= 0.006$$

A variety of representations can be used when applying the properties of operations, which may or may not include parentheses. The area model (NY-3.MD.7c) is a multiplication/division strategy that applies the distributive property (NY-3.OA.5), e.g.,



The area of a $\frac{2}{3} \times \frac{3}{4}$ rectangle is $\frac{6}{12}$ because the whole is partitioned into 12 parts with 6 of them shaded.



- Working directly with teachers, the consultant ensures vocabulary, content, and pedagogy are consistent and vertically aligned

Build capacity around the Next Generation Learning Standards (as per NYSED)

- Teams are actively:
 - Taking “deep dives” into the [Next Generation Learning Standards](#) at each grade level and coherence charts that bridge grade levels

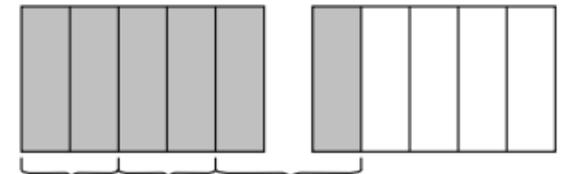
Coherence: NY-3.MD.7 → NY-5.MD.5 → NY-6.G.2
NY-6.G.5

- Studying the NYSED “[Crosswalk](#)” documents to better understand the changes from the Common Core Standards
- Analyzing released NYSED assessment questions for embedded pedagogy
“Messages from the Illuminati”

37 Which expression is equivalent to $60 - 3y - 9$?

- A $3(17 - y)$
- B $3(20 - y) - 3$
- C $17(3 - y)$
- D $20(3 - 3y) - 9$

11 The model below is shaded to represent an expression.



Which expression represents the model?

- A $\frac{1}{3} \times \frac{2}{5}$
- B $\frac{1}{3} \times \frac{5}{2}$
- C $3 \times \frac{2}{5}$
- D $3 \times \frac{5}{2}$

Build capacity around the Next Generation Learning Standards *(continued)*

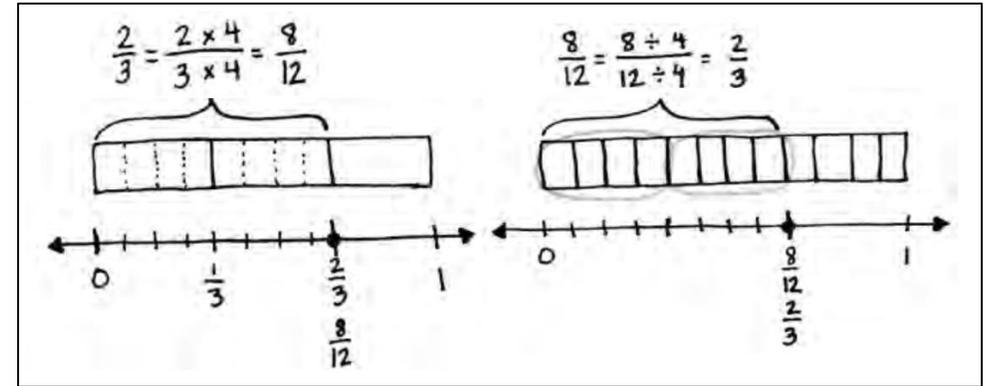
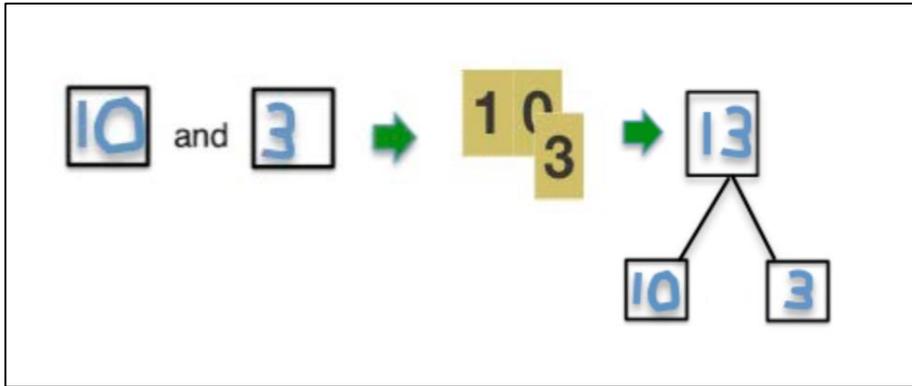
- Teams are actively:
 - Applying the Mathematical Practices to lessons and activities

Mathematical Practices

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

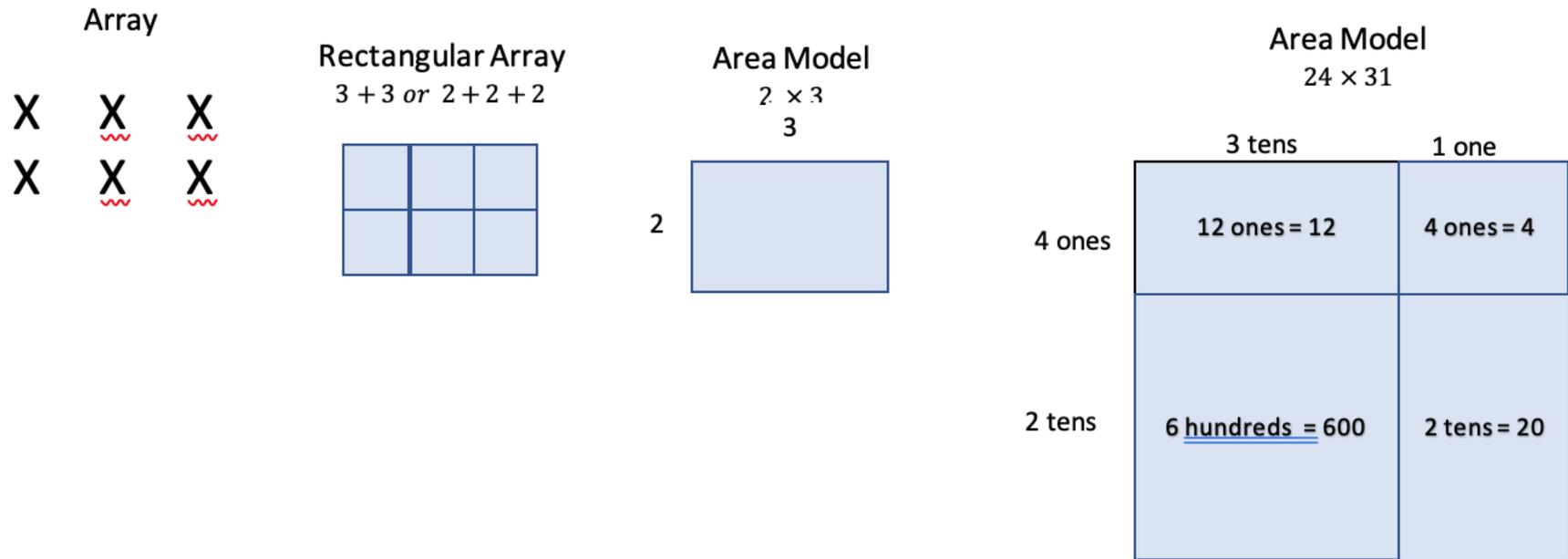
- Highlighting curricular alignments and disconnects between our current program, Primary Mathematics, and NYSED's EngageNY / Eureka Math

Teachers are committed to teaching conceptual understanding of math concepts.



Concrete	Pictorial	Abstract
		$\begin{array}{r} 74 \\ + 38 \\ \hline \end{array}$

Models are consistent through the grade levels.



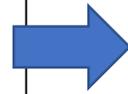
The area model is introduced concretely in Kindergarten when students are asked to arrange items in arrays. By Grade 4, the students are using the same model to multiply 2-digit numbers. In Middle School, the students could use the model to multiply variables such as $(x + y)^2$.

Make A Ten: The Strategy through the Grades

Make a Ten eventually becomes a mental math strategy.

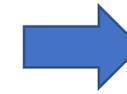
Kindergarten

- Foundational Skills
- What are the partners to 10?



Grade 1

- Make a Ten
- Make the Next Ten

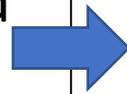


Grade 2

- Make a Hundred

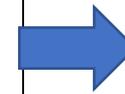
Grade 3

- Make the Next Hundred



Grade 4

- Make a One
- Make the Next One
- Common Units (Denominators)



Grade 5

- Make a One
- Make the Next One
- Mixed Units

Math Concepts and Real-World Applications





Comments and Questions – Thank You!