

New York State Migrant Education Program

Number Sense PD

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Our work for today



Learning Progressions
(Mathematical Domains)



PreK-K: Counting and
Cardinality (CC)



PreK-5: Operations and
Algebraic Thinking (OA)



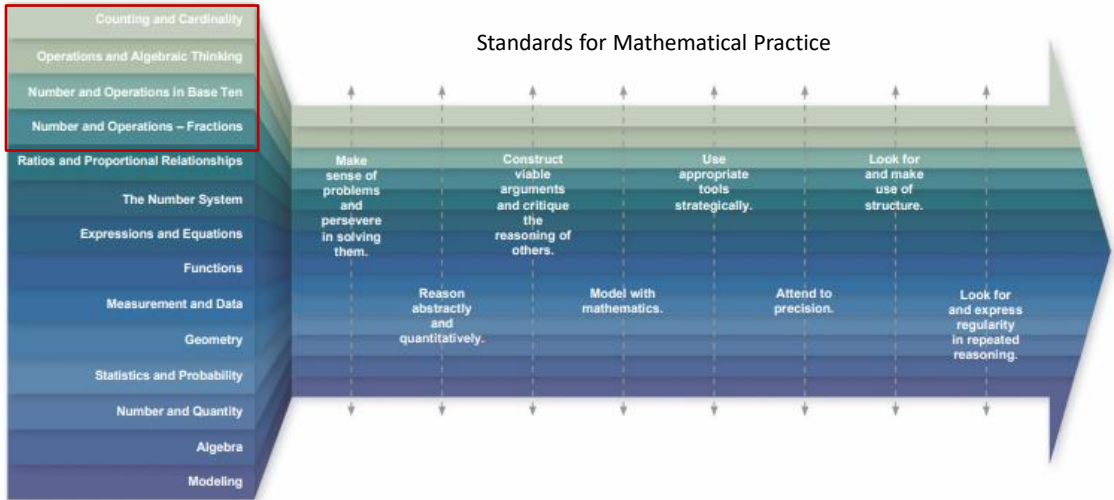
K-5: Number and Operations in
Base Ten (NBT)



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NYS Next Generation Mathematics Learning Standards

Mathematical Domains



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Learning Progressions – Overview

Domains/Grades	PreK	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Counting and Cardinality (CC)	X	X								
Operations and Algebraic Thinking (OA)	X	X	X	X	X	X	X			
Number and Operations in Base Ten (NBT)		X	X	X	X	X	X			
Number and Operations – Fractions					X	X	X			
The Number System								X	X	X
Ratios and Proportional Relationship								X	X	
Expressions, Equations, and Inequalities								X	X	X
Functions										X
Measurement and Data	X	X	X	X	X	X	X			
Statistics and Probability								X	X	X
Geometry	X	X	X	X	X	X	X	X	X	X

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Vocabulary Resources for Educators



GLOSSARY OF VERBS ASSOCIATED WITH THE NEW YORK
STATE NEXT GENERATION MATHEMATICS LEARNING
STANDARDS

[ENGLISH](#)

[SPANISH](#)



NEW YORK STATE NEXT GENERATION MATHEMATICS
LEARNING STANDARDS GLOSSARY GRADES PREK – 8

[ENGLISH](#)

[SPANISH](#)

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Translated Glossaries

NEW!

NYS Next Generation Math Learning Standards

[Chinese](#) | [English](#) | [Spanish](#)

NYS Next Generation Math Learning Standards - One-to-one translation of terms only

[Arabic](#) | [Bengali](#) | [Chinese](#) | [Haitian](#) | [Russian](#) | [Spanish](#) | [Urdu](#)

Glossary of Verbs Associated with the New York State Next Generation Mathematics Learning Standards

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[English Language Arts \(ELA\) Glossaries](#) | [Math Glossaries](#) | [Science Glossaries](#) | [Social Studies Glossaries](#) |
[Glossaries of Cognates](#) | [Guides of Literary Terms & Devices for Language Arts](#)

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Vocabulary: Counting and Cardinality (CC)

Grades PreK & K:

- 1:1 Correspondence
- Cardinality (number of objects counted)
- First & last
- Set (a collection of objects/numbers)
- Compare
- More than/greater than
- Fewer than/less than
- Equal to/same as
- Place value (ones, tens)
- Order



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Whole Group Problem Solving: Counting and Cardinality

Show Me Fingers to 3, to 5:

- Say a number, have the kids show you how many fingers represent the number said.
- For number 1, start with the pinky finger and don't skip any fingers. As student develop mastery, say numbers randomly.
- Example: A possible sequence 1, 2, 1, 2, 3, 2, 3, 2, 3, 2, 1; or 1, 2, 3, 2, 3, 4, 3, 4, 5, 4, 3, 4, 5, 4, 3, 2, 1
- Focus on 5: Have students open one hand to represent 5 (without having to count).

Associated Standard: NY-K.CC.5

EngageNY Lesson: Kindergarten, Module 1, Lesson 4

Activity: Show me Fingers to 5

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Vocabulary: Operations and Algebraic Thinking (OA)

Grades PreK-5:

- Addition/adding to/putting together
- Subtraction/taking from/taking apart
- Multiplication
- Division
- Patterns
- Sum/total
- Difference
- Product
- Quotient
- Expression
- Equation
- Compose/decompose
- Compare



- Numeric sentence
- Sequence
- Factor
- Multiple
- Less than
- More than/greater than
- Equal to/equivalent
- Unknown/variable
- Estimation
- Reasonable answer
- Rounding
- Order of operations
- Ordered pair
- Coordinate plane

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Intro to Breakout Rooms (OA)

- We will go into breakout rooms to work on problems that represent Operations and Algebraic Thinking (OA).
- Problems from Grade 1, Grade 3, and Grade 5
- Feel free to complete what you are comfortable with



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Breakout Room Problem Solving (OA)

Grade 1: Equal Number Pairs for Ten

Task: Given a number, find the number that when added to the given number equals 10 (optional materials are 0-10 number cards (with an extra “5” card, include cards with + and =)

- Students arrange cards from 0 to 10, including the extra 5
- Write 4 numbers on the board (e.g., 5, 9, 1, and 5).
- Students take the 5-group cards that match the numbers written to make two equivalent expressions (e.g., $9 + 1 = 5 + 5$).
- Suggested sequence: 5, 9, 1, 5; 0, 1, 9, 10; 2, 5, 5, 8; 2, 3, 7, 8; 4, 1, 9, 6; 3, 4, 6, 7.

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Breakout Room Problem Solving (OA)

Grade 3: Group counting and Counting by 4s, 8s; lead to multiplying by 4s, 8s

Task: Use white boards

- Count forward and backward by fours twice (while writing the number sequence out).
- Pause between each counting sequence (see improvement).
- After doing the fours twice, have students underline multiples of 8 (e.g., 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 36, 32, 28, 24, 20, 16, 12, 8, 4, 0).
- Count forward and backward by eights twice, pausing between each counting sequence.

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Breakout Room Problem Solving (OA)

Grade 5: Write the Value of the Expression (a.k.a evaluate parentheses)

Task: Write the expressions as single multiplication sentences without parentheses. Use white boards.

- **Problem #1:** $11 \times (15 + 5)$
- **Problem #2:** $(41 - 11) \times 12$
- **Problem #3:** $(20 \times 2) + (6 \times 2)$

expression A mathematical representation containing numbers, variables or a combination of both, and sometimes operation symbols; an expression does not include an equality or inequality symbol.

Examples: numeric/arithmetic expression: $(5 + 2) - 27 \div 3$
algebraic expression: $2a + 3b$

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Vocabulary: Numbers and Operations in Base Ten (NBT)

Grades K-5

- Base-ten units
- Place value (all places within the system)
- Compose/decompose numbers
- Counting sequence
- Compare
- Operations (addition, subtraction, multiplication, division)
- Sum, Difference, Product, Quotient (divisor, dividend, remainder)
- Properties of operations (i.e., commutative, associative)
- More or greater than
- Less than
- Equal to
- Expanded form

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Intro to Breakout Rooms (NBT)

- We will go into breakout rooms to work on problems that represent Numbers and Operations in Base Ten
- Problems from Grade 1, Grade 3, and Grade 5
- Feel free to complete what you are comfortable with



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Breakout Room Problem Solving: NBT

Grade 1: 10 More/10 Less (making ten strategy to add two numbers)

Task: Given an addition problem, decompose one of the numbers to make ten with the other number. Then, find the answer, write and say the number sentence. (use of whiteboards or rekenrek are optional)

- Write $7 + 6 = \underline{\quad}$
- Choose a number to make ten with
- Decompose the other number to make ten with 7
- Write the new number sentence (that includes 10)
- Write both as a true number sentence (i.e., $_ + _ = _ + _ \text{ OR } _ + _ = _ + _$)
- What is the value of the new number sentence?
- What is $7 + 6$? Write and say

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Breakout Room Problem Solving: NBT

Grade 3: Halfway on the Number Line

Task: Use a vertical number line and represent two numbers and the number halfway in between them. Use the “say tens” method. Optional: white boards

- Draw a vertical line with endpoints labeled 0 and 10. What’s halfway between 0 tens and 1 ten?
- On the number line, write the number that is halfway between 0 and 10.
- Repeat process with endpoints labeled 10 and 20.
- More examples: Write 3 tens and 4 tens. Label the tick marks at each end and at the halfway point. What number is halfway between 3 tens and 4 tens? Label your number line.
- Continue with the following possible sequence: 60 and 70, 80 and 90, 40 and 50, and 50 and 60.

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Breakout Room Problem Solving: NBT

Grade 5: Estimate products

Task: Estimate products of 2-digit numbers and 2-digit and 3-digit numbers; Encourage mental math strategies

- When estimating, allow students flexibility when approximating factors (i.e., when estimating the product of 23×42 , both 25×40 or 20×40 are both logical approximations).

- Estimate the product of the following numbers:

- 29×11
- 78×31
- 33×62
- 13×37
- 36×24
- 55×75
- 801×41
- 798×34
- 52×612
- 849×85
- 65×680

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Optional Resource

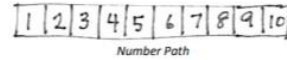
EngageNY Mathematics

Materials

- PreK-12 curriculum aligned to Common Core Standards
- Translated Modules
- Terminology
- Suggested tools and representations

Suggested Tools and Representations

- Rulers for use as a straightedge
- Five dot mat
- Five-frame and ten-frame cards
- Number path
- Left hand mat
- Two hands mat
- 5-group cards
- Rekenrek (Slavonic abacus having beads with a color change at the five)
- Concrete materials in individual bags for counting and sorting (white beans painted red on one side, bags of twigs, dried leaves, dry pasta, pennies, plates, forks, spoons, cups, etc.)
- Commercial concrete materials (linking cubes in tens, non-linking cubes, square-inch tiles, etc.)



Number Path



Left Hand Mat



20-Bead Rekenrek

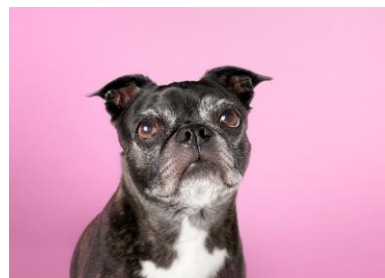


100-Bead Rekenrek

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Great job and thank you!



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