Let's Talk Crosswalk

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SCDN MATH TEAM

Quiet Signal

- When we raise our hand to gather the room back together
- Please help to quiet the room by also raising your hand and stopping table discussions

NYS Next Generation Mathematics Learning Standards and Assessment Time Line

The projected time line for standards and assessments over the coming years is:

- **September 2017:** Adoption of Next Generation Mathematics Learning Standards
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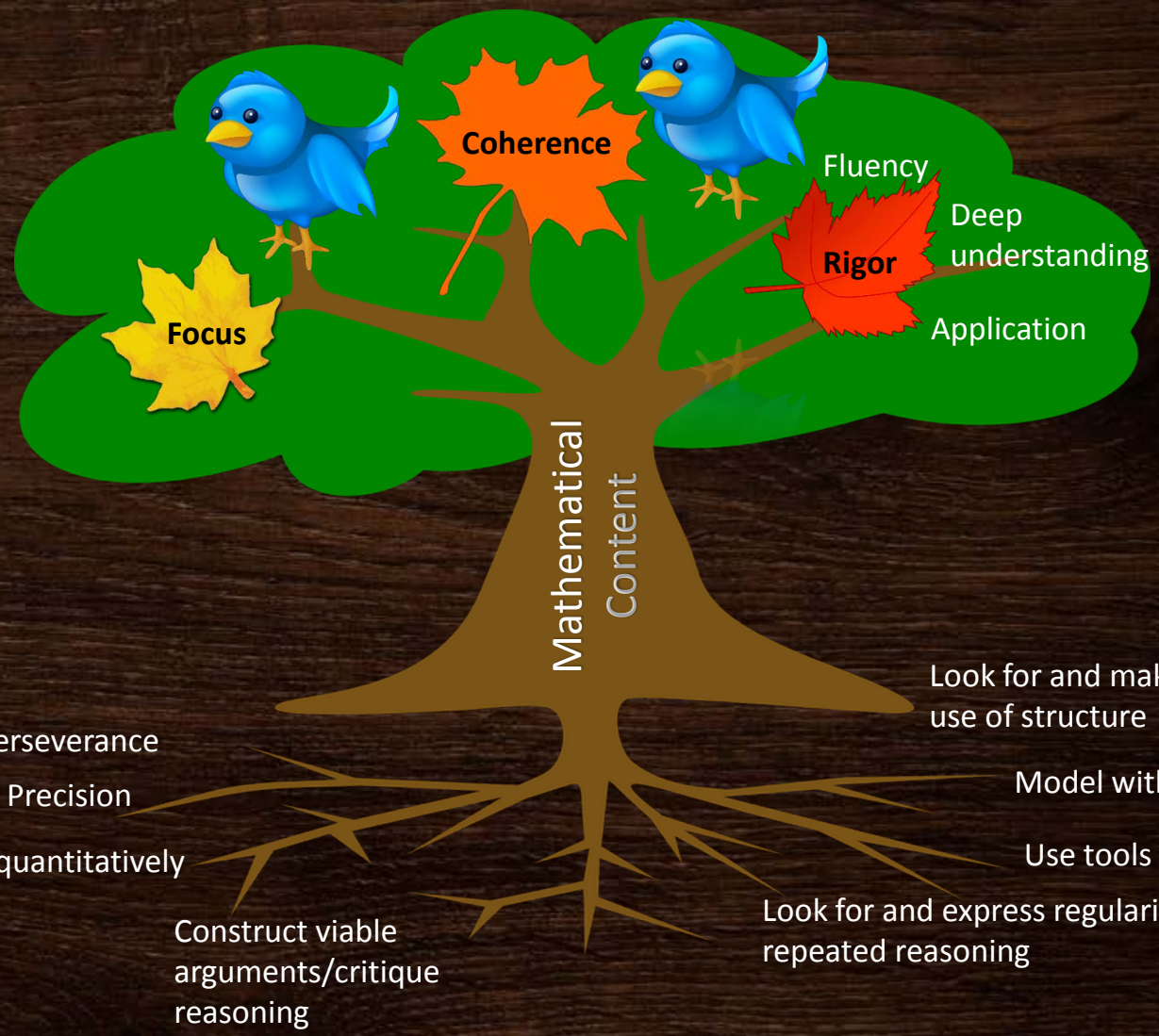
At this time, the timeline regarding the full implementation/assessment alignment of the NYS Next Generation Mathematics Learning Standards at the high school level has not yet been determined and will be forthcoming, however, full implementation/assessment alignment of those standards will not be before the school year 2020-2021.

Spring... the season for rebirth, renewal and regrowth.

- Anonymous

NYS P-12 CCLS for Mathematics



Focus

Algebra I standard S.ID.6b and Algebra II standards such as A.REI.6 and G.GPE.2 were moved to the (+) Plus Standards where they can be placed appropriately to support a district's mathematical program.

Standards Were Moved

Standards Were Consolidated

Algebra II standards S-CP.2, 3, 5 and 6 have been incorporated/consolidated into standard AII-S.CP.4 for clarity purposes and to allow for deeper conceptual understanding of determining independence and conditional probabilities using two-way frequency tables.

Focus

For grade 8 standard NY-8.EE.8b, solving systems algebraically will be limited to at least one equation containing at least one variable whose coefficient is 1.

Clarifications Were Added

Some standards were split up into sub-standards.

For example, 3.MD.2 is now NY-3.MD.2a and 2b to highlight the two distinct skills that include

- Measuring and estimating liquid volumes and masses of objects.
- Adding, subtracting, multiplying or dividing to solve one-step word problems involving masses or liquid volumes (same units).

Focus

Notes were added to further clarify the meaning of the standard, to clarify the use of the words fluency and explore, and to connect the Standards for Mathematical Practice to Mathematical Content.

NY-3.OA.5 Apply properties of operations as strategies to multiply and divide.

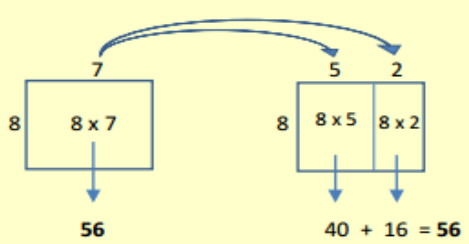
Notes/Diagrams Were Added

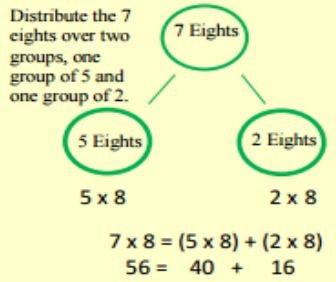
e.g.,

- If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.)
- 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.)
- Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)

Note: Students need not use formal terms for these properties.

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





Additional diagrams were added, particularly at the 3-5 grade levels, to help with clearly defining the expectation of the standard, as well as reinforcing the importance of multiple representations and the transition from the concrete, pictorial to the abstract/written argument, making the standard accessible for all learners.

Coherence

Additional grade 3 standard NY-3.NBT.4b *Read and write four-digit numbers using base-ten numerals, number names and expanded form*, strengthens the place value progression from NY-2.NBT.1 and 3 to NY-4.NBT.2.

Standards Were Added

Grade 6 standard NY-6.G.5 *Using area and volume models to explain perfect squares and perfect cubes* was added to help connect work with other grade-level standards that deal with exponents. The addition strengthens the progression of skills with exponents and irrational numbers at the middle level, and work with radicals (new standard AI-N.RN.3a) and completing the square that will be encountered in Algebra I.

Coherence

Grade K standard NY-K.MD.4 *Explore coins (pennies, nickels, dimes, and quarters) and begin identifying pennies and dimes,* does not require mastery at the grade K level.

“Explore” Language Added

Explore indicates that the topic is an important concept that builds the foundation for progression toward mastery in later grades. Repeated experiences with these concepts, with immersion in the concrete, are vital.

Algebra II standard AII-F.BF.7 Explore the derivation of the formulas for finite arithmetic and finite geometric series. Use the formulas to solve problems.

Rigor

Fluency recommendations have been highlighted at the high school level.

- Flexible in the methods they choose and how these methods support their answers/conclusions/arguments.

Maintain the Balance of Procedural Fluency, Conceptual Understanding and Application.

The standards NY-3.OA.8 and NY-4.OA.3 were modified in that expressions, in addition to equations can be utilized for word problems. Two-step problems do not need to be represented by one equation or expression, can be more than one. Order of operations is an expectation for grade 5, with standard NY-5.OA.1 (nesting not expectation).

The Geometry standard GEO-G.SRT.9 *Justify and apply the formula* $A=\frac{1}{2}$ *ab sin (C) to find the area of any triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side*, was added to allow students the opportunity to apply their knowledge of right triangle trigonometry (conceptual/procedural) to general triangles (application).

Examples of Major Changes Pk-2

This does not include all changes

- Exploration of coins in Kindergarten
- Grade 1
  - Recognize coins and their value.
  - Count a mixed collection of dimes and pennies and determine the cent value (total not to exceed 100 cents), relating the value of coins (pennies and dimes) to place value concepts.
- Grade 2
  - Measuring length to nearest whole, introducing the concept of rounding.
  - Changed “to the nearest five minutes” to “in five minute increments” . Added “Develop an understanding of common terms, such as, but not limited to, quarter past, half past, and quarter to.”
  - Count a mixed collection of coins whose sum is less than or equal to one dollar.

Examples of Major Changes Grades 3-5

This does not include all changes

- Expectations of Expanded Form at each grade level are now specified.
- Grade 3
  - Since angle measure is a 4th grade concept, Grade 3 now focuses on classifying polygons on number of sides and vertices (not angles)
- Grade 4
  - Focus of the standard is multiplying a whole number by a fraction (4 x 1/3), whereas multiplying a fraction by a whole number (1/3 x 4) is an expectation of grade 5 (NY-5.NF.4a).
- Delayed the introduction of the Order of Operations until grade 5 (NY-5.OA.1), originally introduced in standard 3.OA.8.

Examples of Major Changes Grades 6-8

This does not include all changes

- Simple Probability has moved from 7th grade to 6th grade.
- Box-plots are now introduced in 7th grade.
- Mean Absolute Deviation has been removed.
- Two-way frequency tables have been removed from 8th grade and will be introduced in Algebra I.
- Introduction to perfect squares and cubes in 6th grade.
- Solving systems of equations in 8th grade limits coefficients to integers with at-least one equation containing at-least one variable having a coefficient of 1.

Examples of Major Changes Algebra I

This does not include all changes

- Operations with Radicals were added.
- Solving Linear/Quadratic Systems was added.
- Expectation for factoring quadratics involves trinomials whose lead coefficient is 1 after a GCF has been factored.
- Expectation for completing the square involves quadratics whose lead coefficient is 1, with an even linear term.
- Residuals have been moved to the Plus Standards.
- Sequences will be limited to explicit forms only and will be written in subscript notation.

Examples of Major Changes Geometry

This does not include all changes

- Completing the square to derive the center radius form of a circle will involve quadratics whose lead coefficient is 1 and the linear term is even, following from Algebra I.
- Area formula $A = \frac{1}{2}absinC$ has been added.
- Radian measure is now an expectation for Algebra II.
- Cavalieri's Principle, dissection and informal limits are not an expectation, but still can be used to develop area and volume formulas.

Examples of Major Changes Algebra II

This does not include all changes

- Proving Pythagorean Identities has been moved to the Plus Standards.
- Solving 3x3 systems of equations has been moved to the Plus Standards.
- Deriving the equation of a parabola given the focus and directrix has been moved to the Plus Standards.
- Probability and Statistics standards have been consolidated.
- Sequences will only be written in subscript notation.

Where are all of the changes highlighted?

Grade-Level Snapshots

Grade-Level Crosswalks

The Snapshot

New York State Next Generation Mathematics Learning Standards

This document is intended to help educators identify the key changes that have occurred to the content standards for this grade level/course and to assist with designing curriculum and les
to the NYS Next Generation Mathematics Learning Standards. This document does not contain the comprehensive list of learning standards for the grade level/course. The complete list
for the grade level/course can be found at < >.

Grade 1 Snapshot 

Standards New to Grade 1

NY-1.MD.3a Tell and write time in hours and half-hours using analog and digital clocks. **Develop an understanding of common terms, such as, but not limited to, o'clock and half past.**
NY-1.MD.3b Recognize and identify coins (penny, nickel, dime and quarter) and their value and **use the cent symbol (¢) appropriately**.
NY-1.MD.3c Count a mixed collection of coins of dimes and pennies and determine the cent value (not to exceed 100 cents). Students should relate the value of coins (pennies and dimes) to place value concepts seen in the grade one standards from the Number and Operations in Base Ten domain.

Standards Moved from Grade 1

No standards moved.

Highlights/Instructional Considerations

NY-1.OA.1 Students are using addition and subtraction within 20 to solve *one-step* word problems. Problems should be represented using objects, drawings, and equations with a symbol for the unknown number. When solving any problem, students can use objects or drawings, and equations.
NY-1.OA.6b Fluently add and subtract within 10. Fluency involves a mixture of just knowing some answers, knowing some answers from patterns, and knowing some answers from the use of strategies.
NY-1.OA.8 Students are still determining the unknown (in all positions) in an addition/subtraction equation that relates three whole numbers. See examples in the standard.
NY-1.NBT.4 When adding within 100 (two-digit and one-digit, two-digit and multiple of ten) students should be taught/exposed to a variety of strategies based on place value, properties of operations, and the relationship that exists between addition; however, when solving a problem, students can choose any strategy.
NY-1.NBT.6 When subtracting multiples of 10 from multiples of 10 (range of 10-90), students should be taught/exposed to a variety of strategies based on place value, properties of operations, and the relationship between addition and subtraction. When solving any problem, students can choose a concrete model or a drawing that is based on the previous mentioned strategies that demonstrates their understanding.
NY-1.G.1 When working with two and three-dimensional shapes, students should be taught to build *and* draw shapes to possess defining attributes; however, when answering questions, student can choose to build *or* draw the shape.

Two column side by side

New York State Next Generation Mathematics Learning Standards Grade 6 Crosswalk Statistics and Probability		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Summarize and describe distributions.	**6.SP.5c** Giving quantitative measures of center (median and/or mean) and variability (~~**interquartile range and/or mean absolute deviation**~~), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	**NY-6. SP.5c Calculate range and measures of center, as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.** **Note: Measures of center are mean, median, and mode. The measure of variation is the range. Role of outliers should be discussed, but no formula required.**
	6.SP.5d Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	**NY-6. SP.5d** Relate **the range** and the choice of measures of center to the shape of the data distribution and the context in which the data were gathered. **Note: Measures of center are mean, median, and mode. The measure of variation is the range.**
Investigate chance processes and develop, use and evaluate probability models.		**NY-6. SP.6 Understand that the probability of a chance event is a number between 0 and 1 inclusive, that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.**
		NY-6. SP.7 Approximate the probability of a simple event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. **e.g., When rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.** **Note: Compound events are introduced in grade 7.**

Text deleted from the CCLS standard to show that the content is no longer a grade-level expectation (strike-through), replacement text in the Next Generation standard is in bold.

Text modified in the Next Generation standard (bold) to further clarify grade-level expectation.

New standard added to grade-level/course.

New standard added to grade-level/course.

Two column side by side

New York State Next Generation Mathematics Learning Standards Geometry Crosswalk Geometry Circles (G.C)		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Understand and apply theorems about circles.	**G-C.1** Prove that all circles are similar.	**GEO-G.C.1** Prove that all circles are similar.
	G-C.2 Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.* Note: Relationships include but are not limited to the listed relationships. Example: angles involving tangents and secants.	**GEO-G.C.2a** Identify, describe **and apply relationships between the angles and their intercepted arcs** of a circle. **GEO-G.C.2b**. Identify, describe and **apply relationships among radii, chords, tangents, and secants** of a circle. **Note: These relationships that pertain to the circle may be utilized to prove other relationships in geometric figures, e.g., the opposite angles in any quadrilateral inscribed in a circle are supplements of each other.** **Also includes algebraic problems built upon these concepts.**
	G-C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	**STANDARD REMOVED** **Constructing the incenter and circumcenter of a circle has been embedded in standard GEO-G.CO.12. The properties of the angles for a quadrilateral inscribed in a circle is now embedded in standard GEO-G.C.2a.**
Find arc lengths and area of sectors of circles.	**G-C.5** ~~Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality;~~ derive the formula for the area of a sector.	**GEO-G.C.5 Using proportionality, find one of the following given two others; the central angle, arc length, radius or area of sector.** **Note: Angle measure is in degrees.**

CCLS standard has been broken down into parts. The Next Generation standard contains modified/additional language in bold.

CCLS standard has been removed from the grade-level/course.

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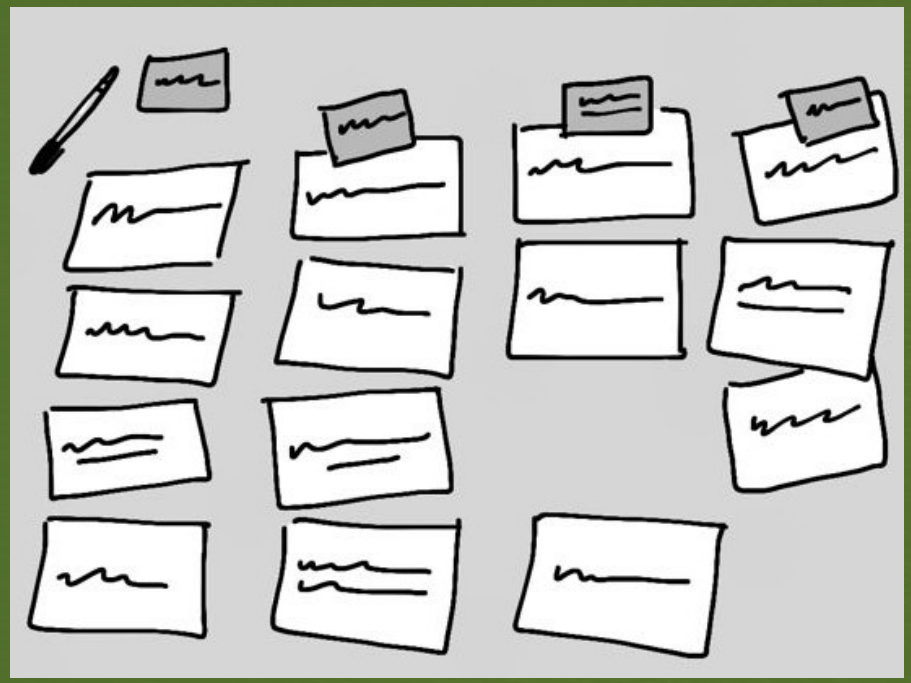
Let's Dig into the Crosswalk Documents



Card Sort

Sort the cards into the categories based on the TYPES OF CHANGES

- Clarification (standard was split up into sub-standards)
- New
- Removed/moved
- "Explore"
- Notes
- Examples/Illustrations

Card Sort Share Out PK – 5

- Clarifications/Split up
  - NY-4.NBT.2a, 2b
  - NY-3.MD.8a, 8b
  - NY-2.OA.1a, 1b
  - NY-2.OA.3a, 3b
- Notes
  - NY-K.OA.5
  - NY-1.NBT.4
  - NY-2.MD.8
  - NY-3.NF.1
- "Explore"
  - NY-PK.CC.3b
  - NY-PK.OA.1
  - NY-K.MD.4
- Examples/Illustrations
  - NY-4.MD.1
  - NY-5.NF.4b
  - NY-5.NF.5a
- New
  - NY-3.NBT.4a
  - NY-1.MD.3c
  - NY-K.OA.6

Card Sort Share Out MS/HS

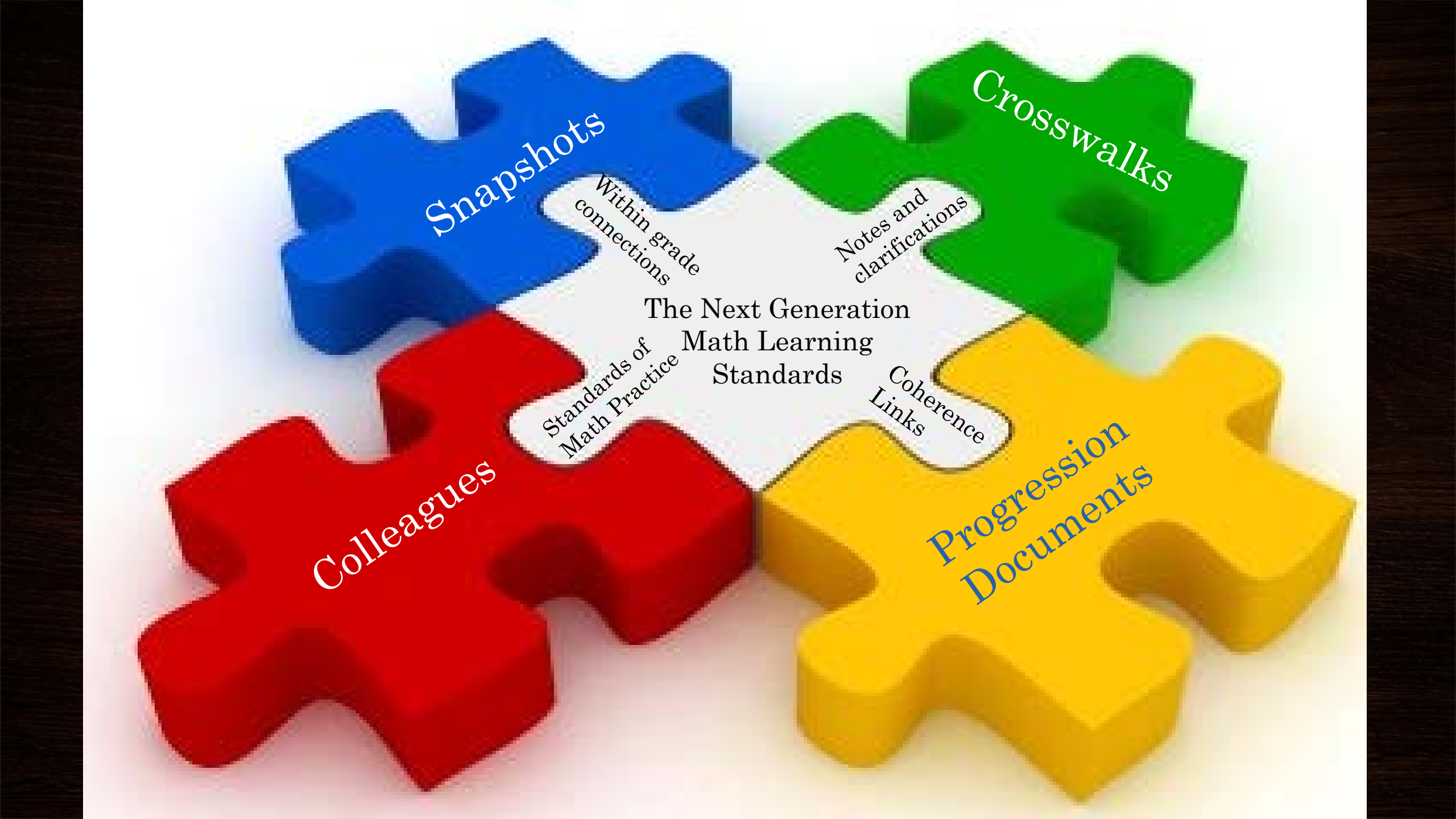
- Clarifications/Split up
  - AI-N.Q.1
  - AI-A.REI.4b
  - AII-F.LE.2
- Moved/Removed
  - 8.SP.4
  - G.GPE.2
  - 7.SP.5, 6
- “Explore”
  - AI-F.BF.3a
  - Geo-G.GPE.5
  - AII-N.RN.1
  - AII-F.BF.7
- Notes
  - NY-6.RP.3d
  - NY-7.EE.4a, 4b
  - NY-8.G.3
- Examples/Illustrations
  - NY-6.NS.7d
  - Geo-G.CO.10
- New
  - NY-6.G.5
  - AI-A.REI.7a
  - Geo-G.SRT.9

Stop and Process – Talking Pens

- Each member of your team will use their pen or pencil
  - You may share one thought you have about the question posed below
  - Once you have shared your thought, place your pen or pencil in the center of the table
  - You may take your pen or pencil back after you share your second thought; members share their thoughts until each person has shared twice

What challenges do you foresee with these changes?
How can we overcome these challenges?

Where do we begin??????


Snapshots
Within grade connections
Crosswalks
Notes and clarifications
The Next Generation Math Learning Standards
Standards of Math Practice
Coherence Links
Colleagues
Progression Documents

How impactful is the new standard/change with respect to our current curriculum?

What foundational knowledge do students have?

What connections can we make within our grade level? Have we been making these connections already?

How does this standard/skill support student learning of mathematical concepts at future grade levels?

Will there be any learning gaps that will need to be addressed?

STANDARD PROGRESSION ANALYSIS

Domain: Solve real-world and mathematical problems involving area, surface area and volume.

Standard:
NY-6. G.5 Use area and volume models to explain perfect squares and perfect cubes.

Foundational Knowledge	Within Grade Connections	Subsequent Knowledge (What does it lead to ?)
Intro of the Square Unit in Grade 3 NY-3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement. NY-3.MD.5a Recognize a square with side length 1 unit, called "a unit square," is said to have "one square unit" of area and can be used to measure area. NY-3.MD.5b Recognize a plane figure which can be covered without gaps or overlaps by *n* unit square units. NY-3.MD.7 Relate area to the operations of multiplication and addition. **Intro to the Cube unit in Grade 5** NY-5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. NY-5.MD.3a Recognize that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. NY-5.MD.3b Recognize that a solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of n cubic units. NY-5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in., cubic ft., and improvised units. NY-5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. NY-5.MD.5a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. **Intro to Exponents and Powers of 10** NY-5.NBT.2 Use whole-number exponents to denote powers of 10. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.	NY-6.EE.1 Write and evaluate numerical expressions involving whole-number exponents. NY-6. G.2 Find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	**Intro to Irrational Numbers in Grade 7/8** NY-7.NS.2d Convert a fraction to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. NY-8.NS.1 Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion eventually repeats. Know that other numbers that are not rational are called irrational. NY-8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Know square roots of perfect squares up to 225 and know that the square root of a non-perfect square is irrational. cube roots of perfect cubes up to 125. **Operations with Radicals and Completing the Square in Algebra I** AI-N.RN.3 Use properties and operations to understand the different forms of rational and irrational numbers. AI-N.RN.3a Perform all four arithmetic operations and apply properties to generate equivalent forms of rational numbers and square roots. AI-A.REI.4 Solve quadratic equations in one variable. Note: Solutions may include simplifying radicals. AI-A.REI.4b Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions.
Skills (Verbs)		**Areas of Concern/Potential Gaps:**
Recognize the shapes of squares and cubes. **Build/compose** models of squares and cubes from unit squares (cubes). **Draw** squares/cubes. **Write** the area (volume) of a perfect square (cube) using exponent notation. **Explain** why certain whole numbers are not perfect squares (cubes).		

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Where can I find the snapshot and crosswalk documents?

HTTP://WWW.NYSED.GOV/

Thank You!

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