Grade 6
What should my students learn from September to November in Mathematics?

By the end of sixth grade, all students should reach the expectations outlined in the NYS standards. This means that no matter what curricular resources your school uses, there are certain experiences all students in sixth grade have. This learning map helps you know what your students should be learning in mathematics from September to November and details examples of research validated pedagogical practices that you can employ to create access to rich and culturally responsive grade level content. This is learning map is not intended to be used to monitor student progress at different times of the year but rather to carefully consider the types of learning experiences students have access to within a given curriculum and ways to enhance instruction and accelerate learning for every student.

Math	**The Sixth Grade Experience** According to the NYS Next Generation Learning Standards, instructional time in Grade 6 should focus on connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems and completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers. Learning experiences should incorporate the use of tables of equivalent ratios, tape diagrams, and using double number lines and equations to solve problems. Throughout the first three months of sixth grade, students will build on the work that was begun in previous grades. As the year begins, students will delve further into the concept of rates and ratios. They will better familiarize themselves with language associated with ratios and rates, become accustomed to ratio notation and will gain a formal understanding of ratios that are equivalent. As students continue the work of this domain, they will also familiarize themselves with tools they can use (e.g. tables, equations, graphs, tape diagrams) to apply their reasoning when solving ratio and rate problems in a real-world context. Students will continue the work of this domain as they delve into the concept of unit rate. Therein, they will gain an understanding of the correlation between ratios, rates, and unit rate. They will also have opportunities to express fractions as ratios and connect how percentages of quantities can be seen as rates expressed per hundred. Students will also be exposed to work in the realm of number systems. In the category of number systems, students will begin the year by building on their rudimentary understanding of the four operations. They will extend their knowledge by adding, subtracting, multiplying, and dividing with positive, rational numbers which will lay the foundation necessary for success, as they delve into negative rational numbers as the school year progresses. Successful understanding of forthcoming concepts will hinge on a sixth-grade student's ability to take the step from *additive* thinking to thinking *multiplicatively.* To support students' ability to do so, they will practice solving word problems using multiplication and division. Additionally, students will have practice deriving patterns in the operations and will have practice utilizing mathematical expressions, to describe those relationships. Students will use what they know about the properties of numbers and the rules used when dividing and multiplying in order to compute factors and

multiples. Thereafter, they will be positioned to recognize and compute least common multiples and greatest common factors. Such investigations include the utilization of Euclid's algorithm to find greatest common factors.

Pedagogical practices that reflect aspects of high-quality math instruction are highlighted throughout the learning map. The suggested pedagogical practices align to Concrete, Representation, and Abstract (CRA) practices. In grade 6, allowing students to respond to questions by way of pictures, tables, and/or number sentences is one productive practice that can be used to help students develop their understanding in these domains. It is also a prudent practice to provide students with space in which they can confer with peers through discourse (e.g. - small group conferencing, face-to-face or remote). Presenting students with problems that have multiple entry points is a practice that has proven effectiveness. This can be done by differentiating tasks and thereby meeting the needs of the varying ability level of one's students (e.g. if students are required to solve 3 of 5 problems, allowing them to select the 3 problems they choose to address).

Students with disabilities may struggle to access some mathematics concepts. Disabilities in the areas of cognitive development may impact attention, perception, visual motor, language processing, memory, reading and writing. Many of the practices outlined in this document can be used to support students' development and retention of mathematics concepts. However, we understand that each student is unique and student needs are unique. You are encouraged to align our stated strategies with the documented needs on the student's IEP.

In addition, when considering planning instruction for MLL/ELLs, it is important to include the academic language they must acquire along with the necessary content knowledge and competencies mentioned above. Essential in this process is the provision of scaffolds and other supports MLL/ELLs need to ensure they can access the required mathematical texts, concepts and skills given their particular levels of English proficiency and prior school experiences.

Special Note for Blended and Remote Instruction

As we move into the fall, we know that there will be a need for digital resources that support blended and remote learning to support the schools shared and inclusive digital curriculum. Linked throughout this learning map are free, digital resources that support the learning that occurs in the beginning of sixth grade such as a **Virtual balance scale (**to strengthen students' understanding and computation of numerical expressions and equality), **Visual Patterns** (which provides access to 400 visual patterns that model linear, quadratic and exponential functions) and **BrainPOP** (a digital tool that offers an introduction on the concept of unit rate and proportionality (among other topics). These digital resources may be used by teachers to improve students' experience as they interact with the content and enhance existing resources in their shared, inclusive and digital curriculum. We ask that you continue to provide ongoing opportunities for students to interact with the digital resources and tools as they practice these skills, whether in-person or remote learning setting.

Using this Learning Map

To create this learning map, the design team considered the most used curricula, Engage New York, alongside the Priority Learning Standards in Mathematics. Although this document is completely aligned to the NYS Next Generation Learning Standards (NGLS), the

	language used is not an exact match, but rather a description of what the learning experiences of sixth graders should look like, from September to November. Unlike ELA, the pedagogical practices suggested in the last column are not meant to be a one-to-one correspondence to the descriptions of learning experiences of the left column. These pedagogical practices rather link to the learning experiences students will have related to each specific mathematical domain. Additionally, this is not meant to provide an exhaustive list of pedagogical practices; instead, it is meant to capture a collection of well-rounded practices one might incorporate into the instructional design of daily lessons that fit within a given curriculum. Regardless of the curricular resources that a school may use, by the end of sixth grade, all students are expected to reach the expectations outlined in the NGLS. While using this learning map, it is important to keep in mind that the instructional sequence of one's school curriculum is carefully and intentionally designed to maintain program fidelity. Lesson omissions or modifications of the order of the curriculum sequence should be carefully considered as it may have unintended and adverse impact on students' current and future acquisition of mathematical competencies.

Domains *(bolded domains are Priority for this grade)*	**What will the learning look like?** *In the beginning of the year, sixth graders have experiences that support the learning below.*	**What pedagogical practices can support this?** *Practices that create access to rich, culturally responsive grade -level work include but are not limited to the examples below.*
Ratios and Proportional Relationships NY-6.RP This learning is connected to Priority Learning Standards **NY-6.RP.1 NY-6.RP.2 NY-6.RP.3**	• Use prior understanding of multiplication to understand and define ratio as well as apply ratios in real word problems. • Use their understanding of the multiplicative nature of ratios, student build equivalent ratios using tables and apply this concept to the coordinate plane • Learn that identifying and manipulating "unit rates" provides a strategy to solving and understanding word problem that involve ratio. • Use unit rates to solve problems in real world contexts: constant speed, etc. • Apply ratio understanding to percent as a rate per 100 and use this understanding to convert measurements.	• Frequently provide students with opportunities to critique and provide feedback to one another in order to support their language development and their ability to construct viable arguments and communicate their reasoning. • Bridge student's prior knowledge of fraction to the concept of ratios rates and unit rates by building concept maps (explaining connections, similarities and differences, etc.) • Provide students with frequent opportunities to make connections between what they know about fractions and what they are learning about ratios. • Employ routines (e.g., Notice & Wonder; Tell Me All You Can) and prompts (e.g., What comes to mind? What do you know about this situation? What would you like to know?) to allow students to make sense of real-world problems involving ratios and proportions.

The Number System **NY-6.NS** This learning is connected to Priority Learning Standards **NY-6.NS.1** **NY-6.NS.4**	• Extend their understanding of the four operations to include all positive rational numbers. • Through the context of word problems, students deeply understand multiplication and division of all rational positive numbers. • Look for patterns, write expressions to describe the relationships between multiplication and division and understand the algorithms for those operations. • Understand and the distributive property and use it within the Order of Operations • Deepen their knowledge of place value and use it as a tool for estimation and come to understand why algorithm of long division (learn in prior grades) works. • Find greatest common factors and least common multiples and apply Euclid's algorithm as an efficient method to find greatest common factors	• Build student's schema for operations with positive rational numbers by bridging their existing understanding of the 4 operations of positive whole numbers as the foundation to operations with all rational numbers. • Help students find patterns between the operations multiplication and division. For example: Educators could use modified versions of "Number Strings" to reveal said patterns. After strategically selecting numbers for the number string, they can be recorded with some entries omitted. Students are then tasked with using multiplication and division to fill-in the blank spaces. Sample responses - (First Volunteer) *"I see that 14 ÷ 2 = 7 so, the number that should be placed above the 7 must be half as much as the number above the 14. There is a 2 above the 14 and since 2 ÷ 2 = 1, I would place a 1 over the 2."* $\frac{\_\_\_}{7}$ $\frac{\_\_\_}{35}$ $\frac{2}{14}$ $\frac{6}{42}$ $\frac{\_\_\_}{63}$ $\frac{1}{7}$ $\frac{\_\_\_}{35}$ $\frac{2}{14}$ $\frac{6}{42}$ $\frac{\_\_\_}{63}$ (Next Volunteer) *"I know that 7 x 9 equals 63. And, since there is a 1 over the 7, I must also multiply that by 9 to find out what number goes above the 63. 9 x 1 = 9 so, a 9 should be placed over the 63."* The class would continue until all blank spaces are filled. Consistent experiences with such number strings will bolster students' abilities to find patterns between multiplication and division. • Encourage students to use varied approaches and strategies to make sense of and solve real world tasks (Principles to Actions, p 24).

		• Use visual models such as arrays to illustrate the connections between partial products and the distributive property bridging strategies learned in earlier grades to current work. • Use concrete models, pictorial representations and properties of division in order to make connections between estimation and place value (making use of the concrete à representational à abstract framework). • Regularly engage students in number sense routines that give them opportunities to deepen their understanding operations with rational numbers. • Virtual Balance Scale: (Click here) • Visual Patterns: (click here) • BrainPOP**:** (Click here)
Geometry NY-6.G	Learning experiences in this domain do not typically occur at this time of the year.	
Statistics and Probability NY-6.SP	Learning experiences in this domain do not typically occur at this time of the year.	
Expressions and Equations NY-6.EE *Priority Learning for this grade*	Learning experiences in this domain do not typically occur at this time of the year.	

Grade 7
What should my students learn from September to November in Mathematics?

By the end of seventh grade, all students should reach the expectations outlined in the NYS standards. This means that no matter what curricular resources your school uses, there are certain experiences all students in seventh grade have. This learning map helps you know what your students should be learning in mathematics from September to November and details research validated pedagogical practices that you can employ to create access to rich and culturally responsive grade level content. This is learning map is not intended to be used to monitor student progress at different times of the year but rather to carefully consider the types of learning experiences students have access to within a given curriculum and ways to enhance instruction and accelerate learning for every student.

Math	**The Seventh Grade Experience** According to the NYS Next Generation Learning Standards, instructional time in Grade 7 should focus on developing understanding of, and applying proportional relationships and developing understanding of operations with rational numbers and working with expressions and linear equations. Learning experiences include testing for equivalent ratios, using equations to represent proportional relationships. Students will also spend time working on multi-step, real-world problems, allowing them to discovery how mathematics can be used in our everyday lives. During the first three months of seventh grade, students will build on the work that was begun in grade six. Students will delve further into the concept of ratio and proportion by examining ideas related to the constant of proportionality. They will come to understand that two quantities are proportional to each other when there exists a constant (number) such that each measure in the first quantity multiplied by this constant gives the corresponding measure in the second quantity. By doing so, students will then be able to identify and/or compose scale drawings, based on said constant of proportionality. At this juncture of the school year, students will also be able to make determinations as to the proportionality of quantities on a coordinate plane. Students apply their understanding of ratios and rates involving fractions to solve real world word problems. (convert between fractions and decimals) In the realm of number systems, students will revisit the use of number lines. However, here, in grade seven, their use of this tool (number line) is extended. As a result of activities with which a number line will be used, students will be able to demonstrate that an integer added to its opposite, results in zero and thus, through self-discovery, students will have uncovered the definition of the additive inverse. Students will continue to solve problems involving both positive and negative integers, by way of addition, subtraction, multiplication, and division and as a result, they will have established a conceptual understanding before the rules for such operations have been developed. As students continue to problem solve with rational numbers, they will begin to incorporate rational numbers into algebraic expressions. Herein, they will demonstrate how quantities are related by representing an evaluating them in various forms.

Pedagogical practices that reflect aspects of high-quality math instruction are highlighted throughout the learning map. The suggested pedagogical practices align to Concrete, Representation, and Abstract (CRA) practices. In grade 7, allowing students to respond to questions by way of pictures, tables, and/or number sentences is one productive practice that can be used to help students develop their understanding in these domains. It is also a prudent practice to provide students with space in which they can confer with peers through discourse (e.g. - small group conferencing, face-to-face or remote). Presenting students with problems that have multiple entry points is a practice that has proven effectiveness. This can be done by differentiating tasks and thereby meeting the needs of the varying ability level of one's students (e.g. if students are required to solve 3 of 5 problems, allowing them to select the 3 problems they choose to address).

Students with disabilities may struggle to access some mathematics concepts. Disabilities in the areas of cognitive development may impact attention, perception, visual motor, language processing, memory, reading and writing. Many of the practices outlined in this document can be used to support students' development and retention of mathematics concepts. However, we understand that each student is unique and student needs are unique. You are encouraged to align our stated strategies with the documented needs on the student's IEP.

In addition, when considering planning instruction for MLL/ELLs, it is important to include the academic language they must acquire along with the necessary content knowledge and competencies mentioned above. Essential in this process is the provision of scaffolds and other supports MLL/ELLs need to ensure they can access the required mathematical texts, concepts and skills given their particular levels of English proficiency and prior school experiences.

Special note for blended and remote instruction:
As we move into the fall, we know that there will be a need for digital resources that support blended and remote learning to support the schools shared and inclusive digital curriculum. Linked throughout this learning map are free, digital resources that support the learning that occurs in the beginning of sixth grade such as **GeoGebra (**Another calculator for functions, geometry, algebra, statistics and 3D math), **Visual Patterns** (which provides access to 400 visual patterns that model linear, quadratic and exponential functions) and **BrainPOP** (a digital tool that offers an introduction on the concept of unit rate and proportionality (among other topics). These digital resources may be used by teachers to improve students' experience as they interact with the content and enhance existing resources in their shared, inclusive and digital curriculum. We ask that you continue to provide ongoing opportunities for students to interact with the digital resources and tools as they practice these skills, whether in-person or remote learning setting.

Using this Learning Map
To create this learning map, the design team considered the most used curricula, Engage New York, alongside the Priority Learning Standards in Mathematics. Although this document is completely aligned to the NYS Next Generation Learning Standards (NGLS), the language used is not an exact match, but rather a description of what the learning experiences of sixth graders should look like, from September to November.

	In addition to expected learning experiences, this learning map identifies research-validated pedagogical practices that teachers can employ to create access to rich, culturally responsive grade level content. Unlike ELA, the pedagogical practices suggested in the last column are not meant to be a one-to-one correspondence to the descriptions of learning experiences of the left column. These pedagogical practices rather link to the learning experiences students will have related to each specific mathematical domain. Additionally, this is not meant to provide an exhaustive list of pedagogical practices; instead, it is meant to capture a collection of well-rounded practices one might incorporate into the instructional design of daily lessons that fit within a given curriculum. Regardless of the curricular resources that a school may use, by the end of seventh grade, all students are expected to reach the expectations outlined in the NGLS. While using this learning map, it is important to keep in mind that the instructional sequence of one's school curriculum is carefully and intentionally designed to maintain program fidelity. Lesson omissions or modifications of the order of the curriculum sequence should be carefully considered as it may have unintended and adverse impact on students' current and future acquisition of mathematical competencies.	
Domains *(bolded domains are Priority for this grade)*	**What will the learning look like?** *In the beginning of the year, seventh graders have experiences that support the learning below.*	**What pedagogical practices can support this?** *Practices that create access to rich, culturally responsive grade -level work include but are not limited to the examples below.*
Ratios and Proportional Relationships NY-7.RP his learning is connected to Priority Learning Standards **NY-7.RP.1 - 3**	• Extend reasoning about ratios, rates, and unit rates to formally define proportional relationships; determine if a relationship is proportional; identify the constant of proportionality and represent proportional relationships with equations in the form $y = kx$. • Analyze relationships displayed in tables, graphs, and verbal descriptions. Relate the equation of a proportional relationship to ratio tables and graphs and interpret the points on the graph within the context of the situation. • Students extend their reasoning about ratios and proportional relationships to compute unit rates for ratios and rates specified by rational numbers, such as a speed of 1/2 mile per 1/4 hour. Students apply their understanding of ratios and rates involving fractions to solve real world word problems. • Students apply their experience with proportional relationships to the context of scale drawings. They	• Encourage students to use varied approaches and strategies to make sense of and solve tasks (Principles to Actions, p 24). • Use and connect student-generated representations (including: concrete, representational, abstract) to deepen student understanding of proportionality and support flexible use of mathematical models. • Regularly employ routines (i.e.: Notice & Wonder; Tell Me All You Can) and prompts (e.g., what comes to mind? What do you know about this situation? What would you like to know?) that allow students to make sense of real-world problems involving ratios and proportions. • Regularly engage students with tasks that allow students to identify and apply unit rate (in tables, equations, graphs, diagrams, and verbal descriptions) to solve increasingly complex problems. • Facilitate the use of digital tools and activities such as "Marcellus the Giant" from Desmos to increase engagement as well as opportunities for students to make sense of the concept of proportionality. • Support the development of new understandings and precise mathematical language by creating ample opportunity for student

	identify the scale factor as the constant of proportionality, calculate the actual lengths and areas of drawings and create scale drawings.	discourse and using discussion protocols such as Mathematical Language Routines (Understanding Language/SCALE, Stanford University) with a particular focus on domain-specific vocabulary such as: *ratio, rate, unit rate, proportional, scale factor, constant of proportionality.* • Implement reasoning routines such as Capturing Quantities or Connecting Representations to support students in identifying important relationships in problem contexts and create models to represent these relationships.
The Number System NY-7.NS This learning is connected to Priority Learning Standards ***NY-7.NS.1-3***	• Students use the number line to model, develop and formalize their rules for the addition and subtraction of integers and they apply this understanding to real-world contexts. They extend these rules to all rational numbers and use properties of operations to perform rational number calculations without the use of a calculator. • Students use properties of operations to develop the rules for multiplying and dividing signed numbers. They find the connections between addition and subtraction and multiplication and division of signed numbers. • Students represent the division of two integers as a fraction and understand that every quotient of integers (with non-0 divisors) is a rational number and can be represented as a decimal. They use various strategies to fluently convert between these fractions and decimal forms. • Students apply properties of operations to solve multi-step real world problems posed with positive and negative rational numbers in any form.	• Connect and use strategies such as long division, place value, common denominators and equivalent fractions to convert between fractions and decimals, including percent were applicable, to highlight equivalent representations of rational numbers. • Facilitate Number Talks for subtraction and addition (recommended in that order) that support students in developing operational fluency with number sense. When appropriate, this routine can be extended to fractions, decimals, and/or negative integers. • Make space for students to connect prior work in multiplication and division of integers to new understandings about fractions, and ratios. • Implement tasks that involve real-world contexts for negative numbers inviting students to interpret and apply rules for addition, subtraction, multiplication and division of negative numbers, using number lines as a model. For example – teachers can formulate and distribute word problems involving temperature, sea level, or steps being taken on a stairway, to demonstrate operations involving negative numbers. (e.g) *"At 9:00 a.m., the temperature was 5°. One hour later, the temperature was -11°. Write a mathematical sentence or use an illustration or diagram to depict the number of degrees the temperature dropped within that one hour."* • Incorporate counting routines and games (such as The 24 Game) that bridge building fluency and sense-making of concepts number systems.

		• Provide students with opportunities to generate their own strategies for solving problems, explain their thinking, then connect their reasoning to more efficient procedures (Principles to Actions, p 47).
Expressions, Equations, and Inequalities NY-7.EE This learning is connected to Priority Learning Standards **NY-7.EE. 1 - 4**	• Identify the constant of proportionality and represent proportional relationships with equations in the form $y = kx$. • Students perform operations with rational numbers in algebraic expressions and equations. They represent, rewrite and evaluate algebraic expressions to reveal how the quantities are related. • Students translate between word problems and algebraic equations and become proficient at solving equations of the form $px+q=r$ and $p(x+q)=r$, where p, q, and r, are specific rational numbers .	• Create opportunities for students to decontextualize and contextualize algebraic expressions and see expressions as objects. An example of this would be tasking students with taking an expression ($6a + $4c) and applying it in the real world, i.e. *"If the price of admission at the amusement park is $6 for adults and $4 for children, what would be the total price for two parents and their 5-year-old triplets?"* • Implement growing pattern tasks that allow students to make connections between concrete, representational, and abstract models of quantities and relationships. • Implement matching tasks in which students match an expression, equation, or inequality to a visual model and written contexts, the justify their reasoning to others (Principles to Actions, p 29). • Facilitate Number Talks for multiplication and division that help students develop facility with properties of operations to manipulate expressions. • Support the development of new understandings and precise mathematical language by creating ample opportunity for student discourse and using discussion protocols such as Mathematical Language Routines (Understanding Language/SCALE, Stanford University) with a particular focus on domain-specific vocabulary such as: *expression, equation, variable, coefficient, constant, inequality* • Use double number lines (Khan Academy) to model relationships between quantities with different units.
Geometry NY-7.G	• Students apply their experience with proportional relationships to the context of scale drawings. They identify the scale factor as the constant of proportionality, calculate the actual lengths and areas of drawings and create scale drawings.	• Create opportunities for students to use estimation routines such as Estimation 180 to reason about scale (ie: the object is about twice as great, half as big) and name relationships (ie: if the actual object is 3 times as great as the model, then the ____ must be 3 times as great as well). • Leverage real-world connections to develop the concept of scale such as map-making, architecture and engineering.

		• Facilitate the use of digital tools and activities such as "Scaling Machines" from Desmos to increase engagement as well as opportunities for students to make sense of the concept of scale. • Employ strategies from the *Ratios and Proportional Relationships* domain (see above). • GeoGebra: (click here) • Visual Patterns: (click here) • BrainPOP: (Click here)
Statistics and Probability NY-7.SP	Learning experiences in this domain do not typically occur at this time of the year.	

Grade 8
What should my students learn from September to November in Mathematics?

By the end of eight grade, all students should reach the expectations outlined in the NYS standards. This means that no matter what curricular resources your school uses, there are certain experiences all students in eighth grade have. This learning map helps you know what your students should be learning in mathematics from September to November and details research validated pedagogical practices that you can employ to create access to rich and culturally responsive grade level content. This is learning map is not intended to be used to monitor student progress at different times of the year but rather to carefully consider the types of learning experiences students have access to within a given curriculum and ways to enhance instruction and accelerate learning for every student.

Math	**The Eighth Grade Experience** According to the NYS Next Generation Learning Standards, instructional time in Grade 8 should focus on formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations and analyzing two-and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem. Students will familiarize themselves with the concept of exponential notation, will examine the structure of exponents, and the properties of exponents. Throughout the first three months of grade 8, students will begin with a foundational approach to the properties of integer exponents. In addition to gaining an understanding of what it means for a number to be raised to a certain power, students will be exposed to negative integers and the laws of exponents. As they investigate the laws of exponents, students are presented with examples of the correlation between mathematical ides. For example, students will revisit use of the distributive property and will learn that if two factors are being multiplied by the same exponent, that equates to each individual factor being multiplied by that same exponent (i.e. $(2 \bullet 3)^3 = 2^3 \bullet 3^3$). As they progress, they will delve into exponential notation (scientific notation), enabling them to predict the value of, and express, very large and very small numbers. During these first few months of school, eighth grade students will also have opportunities to investigate the concept of geometry. At that time, students will not only define transformations (i.e. translations, reflections, and rotations) but they will also learn to apply said concepts, in relation to the congruence of figures. By experimenting with rigid motion, students will have proof that figures can be congruent notwithstanding their orientation, rotation, or even their location. In addition, students will extend the work done in grade seven, as related to adjacent, vertical, complimentary, and supplementary angles, by ascertaining unknown measures of angles. The learning continues as students determine the impact on parallel lines when transversals are introduced therein and how to determine the sums of the measures of interior angles and how to determine the measure the exterior angles of a triangle. Pedagogical practices that reflect aspects of high-quality math instruction are highlighted throughout the learning map. The suggested pedagogical practices align to Concrete, Representation, and Abstract (CRA) practices. In grade 8, allowing students to respond to questions

by way of pictures, tables, and/or number sentences is one productive practice that can be used to help students develop their understanding in these domains. It is also a prudent practice to provide students with space in which they can confer with peers through discourse (e.g. - small group conferencing, face-to-face or remote). Presenting students with problems **that** have multiple entry points is a practice that has proven effectiveness. This can be done by differentiating tasks and thereby meeting the needs of the varying ability level of one's students (e.g. if students are required to solve 3 of 5 problems, allowing them to select the 3 problems they choose to address).

Students with disabilities may struggle to access some mathematics concepts. Disabilities in the areas of cognitive development may impact attention, perception, visual motor, language processing, memory, reading and writing. Many of the practices outlined in this document can be used to support students' development and retention of mathematics concepts. However, we understand that each student is unique and student needs are unique. You are encouraged to align our stated strategies with the documented needs on the student's IEP.

In addition, when considering planning instruction for MLL/ELLs, it is important to include the academic language they must acquire along with the necessary content knowledge and competencies mentioned above. Essential in this process is the provision of scaffolds and other supports MLL/ELLs need to ensure they can access the required mathematical texts, concepts and skills given their particular levels of English proficiency and prior school experiences.

Special note for blended and remote instruction:
As we move into the fall, we know that there will be a need for digital resources that support blended and remote learning to support the schools shared and inclusive digital curriculum. Linked throughout this learning map are free, digital resources that support the learning that occurs in the beginning of eighth grade such as **Desmos** (dynamic, online geometry software that includes graphic and scientific calculator and featured activities connected to linear, quadratic and exponential functions, inequalities, geometric transformations and more), Dan Meyer's **3-Act Problem**s, and **NearPod** (this digital tool will support teachers to create interactive lessons as well as access to a bank of existing resources native to the platform. These digital resources may be used by teachers to improve students' experience as they interact with the content and enhance existing resources in their shared, inclusive and digital curriculum. We ask that you continue to provide ongoing opportunities for students to interact with the digital resources and tools as they practice these skills, whether in-person or remote learning setting.

Using this Learning Map
To create this learning map, the design team considered the most used curricula, Engage New York, alongside the Priority Learning Standards in Mathematics. Although this document is completely aligned to the NYS Next Generation Learning Standards (NGLS), the language used is not an exact match, but rather a description of what the learning experiences of sixth graders should look like, from September to November.

Unlike ELA, the pedagogical practices suggested in the last column are not meant to be a one-to-one correspondence to the descriptions of learning experiences of the left column. These pedagogical practices rather link to the learning experiences students will have related to

	each specific mathematical domain. Additionally, this is not meant to provide an exhaustive list of pedagogical practices; instead, it is meant to capture a collection of well-rounded practices one might incorporate into the instructional design of daily lessons that fit within a given curriculum. Regardless of the curricular resources that a school may use, by the end of eighth grade, all students are expected to reach the expectations outlined in the NGLS. While using this learning map, it is important to keep in mind that the instructional sequence of one's school curriculum is carefully and intentionally designed to maintain program fidelity. Lesson omissions or modifications of the order of the curriculum sequence should be carefully considered as it may have unintended and adverse impact on students' current and future acquisition of mathematical competencies.	
Domains *(bolded domains are Priority for this grade)*	**What will the learning look like?** *In the beginning of the year, seventh graders have experiences that support the learning below.*	**What pedagogical practices can support this?** *Practices that create access to rich, culturally responsive grade -level work include but are not limited to the examples below.*
Ratios and Proportional Relationships	Learning experiences in this domain do not typically occur at this time of the year.	
The Number System NY-8.NS	Learning experiences in this domain do not typically occur at this time of the year.	
Expressions, Equations, and Inequalities NY-8.EE This learning is connected to Priority Learning Standards NY-8.EE.1-2 NY- 8.EE 5-8	• Students use the properties of integer exponents to derive and prove the laws of exponents. They use these laws to understand and to model, rationalize about and compare very large and very small numbers. • They apply this understanding and use the 4 operations with numbers written in scientific notation. They represent, compare, and make calculations of very large and very small numbers in real life contexts.	• Offer students learning opportunities in which they can reason to derive the laws of exponents from their knowledge of operations with rational numbers. • Offer students opportunities to use, discuss and connect representations and models that represent very large and very small numbers (e.g., a number line). Engage them in exercises that require them to make connections among several representations: i.e., physical, visual, symbolic, verbal and contextual (Principles to Actions, pp25) • Encourage students to use varied approaches and strategies to make sense of and solve tasks involving operations with exponents. (Principles to Actions)

Geometry **NY-8.G** This learning is connected to Priority Learning Standards NY-8.G.4	• Students expand their definitions of congruence and similarity to properties of shapes after rigid transformations (translations, reflections, rotations) and dilations. • Students verify experimentally and reason through the effects on the properties of shapes after sequences of rotations, reflections, translations and dilations. • Reason to establish facts about triangle interior/ exterior angle measures; about the angles created by parallel lines and transversals and connect this to transformations. • Apply knowledge of proportional relationships and rates to determine if two figures are similar, and if so, by what scale factor and write proportions to find missing lengths of similar figures. • Connect to the Pythagorean theorem using similar triangles.	• Engage students in discourse that require them to make connections among several representations as they explore transformations, namely physical, visual, symbolic, verbal and contextual (Principles to Actions, pp25). • Provide students will tools to experiment (draw, model predict, verify) with transformations, in an effort to reason through the effects of the transformations on shapes. • Use tools such as geometry software, patty paper, transparencies, pencils and compasses to experiment and draw the transformations. • Use tools such as geometry software, patty paper, transparencies, pencils and rulers and graph paper to experiment and draw to develop initial understanding of the Pythagorean Theorem through similar triangles. • **Desmos:** (click here) • **The 3-Act Problem**s: (Click here) • **NearPod:** (Click Here)
Statistics and Probability NY-8.SP	Learning experiences in this domain do not typically occur at this time of the year.	
Functions **NY-8.F** *Priority Learning for this grade*	Learning experiences in this domain do not typically occur at this time of the year.	