New York State Next Generation Mathematics Learning Standards

New York State Next Generation Mathematics Learning Standards, Grade 7

The following shows the alignment of Amplify Desmos Math to the New York State Next Generation Mathematics Learning Standards for Grade 7 Mathematics.

Cluster	Standard	Description	Amplify Desmos Math Lesson(s)
Ratios and Proportional Relationships (NY-7.RP)			
Analyze proportional relationships and use them to solve real-world and mathematical problems.	**NY-7.RP.1** *CCSS: 7.RP.A.1*	Compute unit rates associated with ratios of fractions.	7.1.04, 7.4.02, 7.4.03, 7.4 Practice Day 1, 7.4 Practice Day 2
	NY-7.RP.2 *CCSS: 7.RP.A.2*	Recognize and represent proportional relationships between quantities.	7.1.02, 7.1 Practice Day 1, 7.2.02, 7.2.03, 7.2.04, 7.2.05, 7.2.06, 7.2.07, 7.2 Practice Day 1, 7.2.08, 7.2.09, 7.2.10, 7.2.11, 7.2.12, 7.2 Practice Day 2, 7.4.03, 7.4.04, 7.4 Practice Day 1, 7.4.09, 7.4 Practice Day 2
	NY-7.RP.2a *CCSS: 7.RP.A.2.A*	Decide whether two quantities are in a proportional relationship.	7.1.01, 7.2.02, 7.2.03, 7.2.07, 7.2 Practice Day 1, 7.2.08, 7.2.10, 7.2 Practice Day 2, 7.3.01, 7.3.03, 7.3 Practice Day 1, 7.3.07, 7.3 Practice Day 2, 7.4 Practice Day 2
	NY-7.RP.2b *CCSS: 7.RP.A.2.B*	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	7.1.04, 7.2.03, 7.2.05, 7.2.06, 7.2 Practice Day 1, 7.2.09, 7.2.10, 7.3.01, 7.3.03
	NY-7.RP.2c *CCSS: 7.RP.A.2.C*	Represent a proportional relationship using an equation.	7.2.04, 7.2.05, 7.2.06, 7.2.07, 7.2 Practice Day 1, 7.2.10, 7.2 Practice Day 2, 7.4 Practice Day 2
	NY-7.RP.2d *CCSS: 7.RP.A.2.D*	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and $(1, r)$ where r is the unit rate.	7.2.09, 7.2 Practice Day 2
	NY-7.RP.3 *CCSS: 7.RP.A.3*	Use proportional relationships to solve multistep ratio and percent problems.	7.1.07, 7.4.04, 7.4.05, 7.4.06, 7.4.07, 7.4 Practice Day 1, 7.4.08, 7.4.09, 7.4.10, 7.4.11, 7.4.12, 7.4 Practice Day 2, 7.8.12

Cluster	Standard	Description	Amplify Desmos Math Lesson(s)
The Number System (NY-7.NS)			
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	**NY-7.NS.1** *CCSS: 7.NS.A.1*	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers. Represent addition and subtraction on a horizontal or vertical number line.	7.5.02, 7.5.04, 7.5.05, 7.5 Practice Day 1, 7.5.09
	NY-7.NS.1a *CCSS: 7.NS.A.1.A*	Describe situations in which opposite quantities combine to make 0.	7.5.01, 7.5 Practice Day 1
	NY-7.NS.1b *CCSS: 7.NS.A.1.B*	Understand addition of rational numbers; $p + q$ is the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.	7.5.02, 7.5.03, 7.5.04, 7.5 Practice Day 1
	NY-7.NS.1c *CCSS: 7.NS.A.1.C*	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	7.5.02, 7.5.04, 7.5.05, 7.5 Practice Day 1
	NY-7.NS.1d *CCSS: 7.NS.A.1.D*	Apply properties of operations as strategies to add and subtract rational numbers.	7.5.03, 7.5.04, 7.5 Practice Day 1, 7.5.10, 7.5 Practice Day 2
	NY-7.NS.2 *CCSS: 7.NS.A.2*	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	7.5.06, 7.5.09, 7.5 Practice Day 2
	NY-7.NS.2a *CCSS: 7.NS.A.2.A*	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	7.5.07, 7.5 Practice Day 2
	NY-7.NS.2b *CCSS: 7.NS.A.2.B*	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then . Interpret quotients of rational numbers by describing real-world contexts.	7.5.08, 7.5 Practice Day 2
	NY-7.NS.2c *CCSS: 7.NS.A.2.C*	Apply properties of operations as strategies to multiply and divide rational numbers.	7.5.08, 7.5.10, 7.5 Practice Day 2

Cluster	Standard	Description	Amplify Desmos Math Lesson(s)
	NY-7.NS.2d *CCSS: 7.NS.A.2.D*	Convert a fraction to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	7.4.13
	NY-7.NS.3 *CCSS: 7.NS.A.3*	Solve real-world and mathematical problems involving the four operations with rational numbers.	7.5 Practice Day 1, 7.5.10, 7.5 Practice Day 2, 7.5.11, 7.5.12, 7.5.13
Expressions, Equations, and Inequalities (NY-7.EE)			
Use properties of operations to generate equivalent expressions.	**NY-7.EE.1** *CCSS: 7.EE.A.1*	Add, subtract, factor, and expand linear expressions with rational coefficients by applying the properties of operations	7.6.08, 7.6.09, 7.6.10, 7.6.11, 7.6 Practice Day 1, 7.6 Practice Day 2
	NY-7.EE.2 *CCSS: 7.EE.A.2*	Understand that rewriting an expression in different forms in real-world and mathematical problems can reveal and explain how the quantities are related.	7.4.05, 7.4 Practice Day 1, 7.4.08, 7.4.10, 7.4 Practice Day 2, 7.6.08, 7.7.03, 7.7.04
Solve real-life and mathematical problems using numerical and algebraic expressions, equations, and inequalities.	**NY-7.EE.3** *CCSS: 7.EE.B.3*	Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate. Assess the reasonableness of answers using mental computation and estimation strategies.	7.5.05, 7.5 Practice Day 1, 7.5.10, 7.5 Practice Day 2, 7.5.11, 7.5.12, 7.5.13, 7.6.02, 7.6.03, 7.6.04, 7.6.11, 7.6.12, 7.6 Practice Day 1, 7.6 Practice Day 2, 7.8.02
	NY-7.EE.4 *CCSS: 7.EE.B.4*	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	7.4.08, 7.4.10, 7.6.03, 7.6.04, 7.6.12, 7.6 Practice Day 1, 7.6.13, 7.6.14, 7.6.15, 7.6 Practice Day 2, 7.7.03, 7.7.04, 7.7 Practice Day 1
	NY-7.EE.4a *CCSS: 7.EE.B.4.A*	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.	7.6.05, 7.6.06, 7.6.07, 7.6.08, 7.6.11, 7.6.12, 7.6 Practice Day 1, 7.6 Practice Day 2
	NY-7.EE.4b *CCSS: 7.EE.B.4.B*	Solve word problems leading to inequalities of the form $px + q > r$, $px + q \geq r$, $px + q \leq r$, or $px + q < r$, where p, q, and r are rational numbers. Graph the solution set of the inequality on the number line and interpret it in the context of the problem.	7.6.13, 7.6.14, 7.6.15, 7.6.16, 7.6.17, 7.6 Practice Day 2 **Alignment note:** NYS includes non-strict inequalities. Non-strict inequalities are addressed in the indicated lessons.

Cluster	Standard	Description	Amplify Desmos Math Lesson(s)
Geometry (NY-7.G)			
Draw, construct, and describe geometrical figures and describe the relationships between them.	**NY-7.G.1** *CCSS: 7.G.A.1*	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	7.1.01, 7.1.02, 7.1.03, 7.1.04, 7.1.05, 7.1 Practice Day 1, 7.1.06, 7.1.07, 7.1.08, 7.1.09, 7.1.10, 7.1 Practice Day 2
	NY-7.G.2 *CCSS: 7.G.A.2*	Draw triangles when given measures of angles and/or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	7.7.05, 7.7.06, 7.7.07, 7.7.08, 7.7 Practice Day 1
	NY-7.G.3 *CCSS: 7.G.A.3*	Describe the two-dimensional shapes that result from slicing three-dimensional solids parallel or perpendicular to the base.	7.7.09
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	**NY-7.G.4** *CCSS: 7.G.B.4*	Apply the formulas for the area and circumference of a circle to solve problems.	7.3.03, 7.3.04, 7.3 Practice Day 1, 7.3.06, 7.3.07, 7.3.08, 7.3.09, 7.3 Practice Day 2
	NY-7.G.5 *CCSS: 7.G.B.5*	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	7.7.02, 7.7.03, 7.7.04, 7.7 Practice Day 1
	NY-7.G.6 *CCSS: 7.G.B.6*	Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles and trapezoids. Solve surface area problems involving right prisms and right pyramids composed of triangles and trapezoids. Find the volume of right triangular prisms, and solve volume problems involving three-dimensional objects composed of right rectangular prisms.	6.1.01, 6.1.02, 6.1.08, 7.1 Practice Day 1, 7.7.10, 7.7.11, 7.7.12, 7.7.13, 7.7 Practice Day 2 **Alignment note:** NYS adds specific mention of trapezoids, right pyramids, right triangular prisms, and right rectangular prisms. These figures are addressed in the indicated lessons.

Cluster	Standard	Description	Amplify Desmos Math Lesson(s)
Statistics and Probability (NY-7.SP)			
Draw informal comparative inferences about two populations.	**NY-7.SP.1** *CCSS: aligned to parts of 6.SP.B.4, 6.SP.B.5.C*	Construct and interpret box-plots, find the interquartile range, and determine if a data point is an outlier.	6.8.12, 6.8.13, 6.8.14, 6.8.15, 6.8.16, 6.8 Practice Day 2, 7.8.13, 7.8.14 **Alignment note:** NYS adds specific mention of outliers. In Lesson 6.8.15, students interpret box plots that contain outliers, which is the expectation of this standard. From the New York State Next Generation Mathematics Learning Standards: "Note: Students in grade 7 are not expected to construct box-plots that include outliers in the data, but students are expected to interpret box-plots that may contain outliers."
	NY-7.SP.3 *CCSS: 7.SP.B.3*	Informally assess the degree of visual overlap of two quantitative data distributions.	7.8.14, 7.8.15, 7.8 Practice Day 2
	NY-7.SP.4 *CCSS: 7.SP.B.4*	Use measures of center and measures of variability for quantitative data from random samples or populations to draw informal comparative inferences about the populations.	7.8.14, 7.8.15, 7.8 Practice Day 2
Investigate chance processes and develop, use, and evaluate probability models.	**NY-7.SP.8** *CCSS: 7.SP.C.8*	Find probabilities of compound events using organized lists, sample space tables, tree diagrams, and simulation.	7.8.04, 7.8.05, 7.8 Practice Day 1
	NY-7.SP.8a *CCSS: 7.SP.C.8.A*	Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	7.8.06, 7.8 Practice Day 1, 7.8 Practice Day 2
	NY-7.SP.8b *CCSS: 7.SP.C.8.B*	Represent sample spaces for compound events using methods such as organized lists, sample space tables, and tree diagrams. For an event described in everyday language, identify the outcomes in the sample space which compose the event.	7.8.06, 7.8 Practice Day 1, 7.8 Practice Day 2
	NY-7.SP.8c *CCSS: 7.SP.C.8.C*	Design and use a simulation to generate frequencies for compound events.	7.8.07, 7.8.08, 7.8 Practice Day 1

The Standards for Mathematical Practice, New York State Next Generation Mathematics Learning Standards, Grade 7

The following shows the alignment of Amplify Desmos Math, Grade 7, to the Standards for Mathematical Practice for the New York State Next Generation Mathematics Learning Standards.

Mathematical Practices	Description	Amplify Desmos Math Lesson(s)
	MP1 Make sense of problems and persevere in solving them. *CCSS: MP1*	
MP1 | Make sense of problems and persevere in solving them. *CCSS: MP1*	Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.	7.1.01, 7.1.10, 7.4.06, 7.4.08, 7.4.09, 7.5.05, 7.5.10, 7.5.11, 7.6.12, 7.7.05, 7.7.11, 7.8.10
MP2 | Reason abstractly and quantitatively. *CCSS: MP2*	Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.	7.1.06, 7.1.07, 7.2.03, 7.2.05, 7.2.06, 7.2.08, 7.2.10, 7.4.04, 7.5.01, 7.5.02, 7.5.06, 7.5.07, 7.5.08, 7.5.11, 7.6.02, 7.6.03, 7.6.04, 7.6.12, 7.6.13, 7.7.03, 7.8.05, 7.8.07, 7.8.09

Mathematical Practices	Description	Amplify Desmos Math Lesson(s)
MP3 | Construct viable arguments and critique the reasoning of others. *CCSS: MP3*	Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.	7.1.02, 7.1.03, 7.1.10, 7.2.12, 7.3.02, 7.3.05, 7.3.07, 7.4.02, 7.4.07, 7.4.09, 7.4.10, 7.4.13, 7.5.01, 7.5.10, 7.5.13, 7.6.01, 7.6.02, 7.6.08, 7.6.09, 7.6.14, 7.6.15, 7.6.16, 7.7.03, 7.7.09, 7.7.10, 7.8.01, 7.8.03, 7.8.04, 7.8.07, 7.8.09, 7.8.10, 7.8.12
MP4 | Model with mathematics. *CCSS: MP4*	Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.	7.2.11, 7.4.09, 7.4.12, 7.5.12, 7.5.13, 7.6.17, 7.8.07, 7.8.15
MP5 | Use appropriate tools strategically. *CCSS: MP5*	Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.	7.4.03, 7.4.04, 7.4.12, 7.6.03, 7.7.12, 7.8.02, 7.8.06

Mathematical Practices	Description	Amplify Desmos Math Lesson(s)
MP6 | Attend to precision. *CCSS: MP6*	Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.	7.1.02, 7.1.10, 7.2.02, 7.2.09, 7.2.12, 7.3.02, 7.3.04, 7.4.01, 7.4.06, 7.5.06, 7.5.07, 7.6.05, 7.6.09, 7.6.13, 7.7.02, 7.7.09, 7.8.02, 7.8.14
MP7 | Look for and make use of structure. *CCSS: MP7*	Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.	7.1.02, 7.1.04, 7.1.05, 7.2.02, 7.2.04, 7.2.07, 7.2.08, 7.3.04, 7.3.05, 7.3.08, 7.4.02, 7.5.02, 7.5.04, 7.5.09, 7.6.04, 7.6.05, 7.6.07, 7.6.10, 7.7.02, 7.7.03, 7.7.11
MP8 | Look for and express regularity in repeated reasoning. *CCSS: MP8*	Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.	7.1.01, 7.1.05, 7.2.04, 7.2.06, 7.2.09, 7.3.01, 7.3.06, 7.3.09, 7.4.03, 7.4.05, 7.4.08, 7.5.02, 7.6.01, 7.6.08, 7.7.01, 7.7.05, 7.8.04, 7.8.05