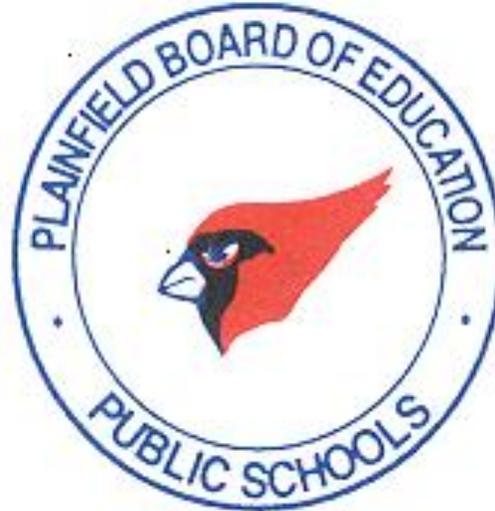


Plainfield Public Schools

Plainfield Secondary Math

Sequence & Pacing Guide

New Jersey Student Learning Standard



****REVISED***

PLAINFIELD PUBLIC SCHOOLS

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The Plainfield Secondary Math Curriculum is based on New Jersey Student Learning Standard. These standards are based on a philosophy of teaching and learning mathematics that is consistent with the current research and exemplary practices. Each unit is comprised of standards that are identified as major (▲), supporting (●) and/or additional content (■). Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than others based on the depth of the ideas, time needed to master or model, and their importance to future grade level. Major standards are purposefully placed in tested grades for ensuring time for formal instruction. The goal of the curriculum is to ensure all students possess the following:

- conceptual understanding—comprehension of mathematical concepts, operations, and relations
- procedural fluency—skill in carrying out procedures flexibly, accurately, efficiently, and appropriately
- strategic competence—ability to formulate, represent, and solve mathematical problems
- adaptive reasoning—capacity for logical thought, reflection, explanation, and justification
- productive disposition—habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy.

Standards for Mathematical Practice

Mathematical Practice	Explanation
<p>Mathematical Practice 1: Make sense of problems and persevere in solving them</p>	<p>In grade 8, students solve problems involving ratios and rates and discuss how they solved the problems. Students solve real world problems through the application of algebraic and geometric concepts. Students seek the meaning of a problem and look for efficient ways to represent and solve it. They may check their thinking by asking themselves, “What is the most efficient way to solve the problem?”, “Does this make sense?”, and “Can I solve the problem in a different way?”.</p>
<p>Mathematical Practice 2: Reason abstractly and quantitatively.</p>	<p>In grade 8, students represent a wide variety of real world contexts through the use of real numbers and variables in mathematical expressions, equations, and inequalities. Students contextualize to understand the meaning of the number or variable as related to the problem and decontextualize to manipulate symbolic representations by applying properties of operations.</p>
<p>Mathematical Practice 3: Construct viable arguments and critique the reasoning of others.</p>	<p>In grade 8, students construct arguments using verbal or written explanations accompanied by expressions, equations, inequalities, models, and graphs, tables, and other data displays (i.e. box plots, dot plots, histograms, etc.). They further refine their mathematical communication skills through mathematical discussions in which they critically evaluate their own thinking and the thinking of other students. They pose questions like —How did you get that? —Why is that true? —Does that always work? They explain their thinking to others and respond to others’ thinking.</p>
<p>Mathematical Practice 4: Model with mathematics.</p>	<p>In grade 8, students model problem situations symbolically, graphically, tabular, and contextually. Students form expressions, equations, or inequalities from real world contexts and connect symbolic and graphical representations. Students explore covariance and represent two quantities simultaneously. They use measures of center and variability and data displays (i.e. box plots and histograms) to draw inferences, make comparisons and formulate predictions. Students use experiments or simulations to generate data sets and create probability models. Students need many opportunities to connect and explain the connections between the different representations. They should be able to use all of these representations as appropriate to a problem context.</p>
<p>Mathematical Practice 5: Use appropriate tools strategically.</p>	<p>Students consider available tools (including estimation and technology) when solving a mathematical problem and decide when certain tools might be helpful. For instance, students in grade 8 may translate a set of data given in tabular form to a graphical representation to compare it to another data set. Students might draw pictures, use applets, or write equations to show the relationships between the angles created by a transversal.</p>

<p>Standard for Mathematical Practice 6: Attend to precision.</p>	<p>In grade 8, students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning. Students use appropriate terminology when referring to the number system, functions, geometric figures, and data displays.</p>
<p>Standard for Mathematical Practice 7: Look for and make use of structure</p>	<p>Students routinely seek patterns or structures to model and solve problems. In grade 8, students apply properties to generate equivalent expressions and solve equations. Students examine patterns in tables and graphs to generate equations and describe relationships. Additionally, students experimentally verify the effects of transformations and describe them in terms of congruence and similarity</p>
<p>Standard for Mathematical Practice 8: Look for and express regularity in repeated reasoning.</p>	<p>In grade 8, students use repeated reasoning to understand algorithms and make generalizations about patterns. Students use iterative processes to determine more precise rational approximations for irrational numbers. During multiple opportunities to solve and model problems, they notice that the slope of a line and rate of change are the same value. Students flexibly make connections between covariance, rates, and representations showing the relationships between quantities.</p>

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Grade 8 Pacing Chart

Unit /Quarter 1		
# Days	Topics	Standards
20	<p>Number Sense</p> <ul style="list-style-type: none"> Estimate very large and very small quantities with numbers expressed in the form of a single digit times an integer power of 10. Compare numbers written in the form of a single digit times an integer power of 10 and express how many times as much one is than the other Add, subtract, multiply and divide numbers expressed in scientific notation, including problems in which one number is in decimal form and one is in scientific notation. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology (e.g. recognize 4.1×10^{-2} and 4.1×10^{-2} as 4.1×10^2). Compare irrational numbers by replacing each with its rational approximation. Locate rational approximations on a number line. 	<p>8.EE.A.1 </p> <p>8.EE.A.3 </p> <p>8.EE.A.4 </p> <p>8.NS.1 </p> <p>8.NS.2 </p>
10	<p>Proportional Relationship</p> <ul style="list-style-type: none"> Show, using similar triangles, and explain why the slope, m, is the same between any two distinct points on a non-vertical line. Derive, from two points, the equation $y = mx + b$ for a line intercepting the vertical axis at b. 	<p>8.EE.B.5 </p> <p>8.EE.B.6 </p>

Unit / Quarter 2

# Days	Topics	Standards
23	<p>Functions</p> <ul style="list-style-type: none">• Describe a function as providing a single output for each input. Determine whether non-numerical relationships are functions. Describe and read ordered pairs as containing an input, and the corresponding output• Analyze functions represented algebraically, as a table of values, and as a graph.• Interpret functions represented by a verbal description. Given two functions, each represented in a different way, compare their property.• Provide qualitative descriptions of graphs (e.g. where increasing or decreasing, linear or non-linear). given a verbal description, sketch a graph of a function based on the qualitative features described	<p>8.EE.B.5 ▲</p> <p>8.EE.B.6 ▲</p> <p>8.F.A.1 ▲</p> <p>8.F.A.2 ▲</p> <p>8.F.A.3 ▲</p> <p>8.F.B.4 ▲</p> <p>8.F.B.5 ▲</p> <p>8. SP.A.1 ▲</p> <p>8. SP. A.2 ▲</p> <p>8. SP.A.3 ▲</p> <p>8. SP.A.4 ▲</p>

Unit / Quarter 3

# Days	Topics	Standards
20	<p>Pythagorean Theorem and Volume</p> <ul style="list-style-type: none"> • Solve equations of the form $x^2 = p$, where p is a positive rational number. Use the square root symbol to represent solutions to equations of the form $x^2 = p$. Show or explain that $\sqrt{2}$ is an irrational number. • Solve equations of the form $x^3 = p$, where p is a positive rational number. Use the cube root symbol to represent solutions to equations of the form $x^3 = p$. • Use volume formulas to find a single unknown dimension of cones, cylinders and spheres when solving real world problems. • determine the distance between two points in a coordinate plane by drawing a right triangle and applying the Pythagorean Theorem 	<p>8.G.B.6 ▲</p> <p>8.G.B.7 ▲</p> <p>8.G.B.8 ▲</p>
15	<p>Geometric Motion</p> <ul style="list-style-type: none"> • Describe a transformation or sequence of transformations that show the similarity between them given two similar two-dimensional figures. • Give informal arguments to establish the angle-angle criterion for similarity of triangles. 	<p>8.G.A.1 ▲</p> <p>8.G.A.1.A ▲</p> <p>8.G.A.1.B ▲</p> <p>8.G.A.1.C ▲</p> <p>8.G.A.1 ▲</p> <p>8.G.A.2 ▲</p> <p>8.G.A.3 ▲</p> <p>8.G.A.4 ▲</p> <p>8.G.A.5 ▲</p>

Unit / Quarter 4

#Days	Topics	Standards
35	<p>Equations</p> <ul style="list-style-type: none">• Solve linear equations that have fractional coefficients; include equations requiring use of the distributive property and collecting like terms.• Solve real-world and mathematical problems leading to two linear equations in two variables.• Describe clustering, outliers, positive or negative association, linear or non-linear association when explaining patterns of association in a scatter plot.• Given the equation for a linear model, solve problems in the context of measurement data	<p>8.EE.C.7 ▲</p> <p>8.EE.C.7.A ▲</p> <p>8.EE.C.7.B ▲</p> <p>8.EE.C.8 ▲</p> <p>8.EE.C.8 .A ▲</p> <p>8.EE.C.8 .B ▲</p> <p>8. SP.A.1 ●</p> <p>8. SP. A.2 ●</p> <p>8. SP.A.3 ●</p> <p>8. SP.A.4 ●</p>

Glossary

Additional Content Standards: Standards that are taught in addition to the context for supporting and focus standards, but do not require the same level of attention.

Big Ideas: The foundational understandings - main ideas, conclusions, or generalizations relative to the unit's "unwrapped" concepts - that educators want their students to discover and state in their own words by the end of the unit of study. Big Ideas convey to students the benefit or value of learning the standards in focus that they are to remember long after instruction ends.

Depth of Knowledge (DOK): A four-level framework used to analyze the cognitive demand of a standard, assessment, or task.

- Level One - recall
- Level Two - skill/concept
- Level Three - strategic thinking
- Level Four - extended thinking

Essential Questions: Engaging, open-ended questions that educators use to spark student interest in learning the content of the unit about to commend. Even though plainly worded, they carry with them an underlying rigor. Responding to them in a way that demonstrates genuine understanding requires more than superficial thought. Along with the "unwrapped" concepts and skills from the Priority Standards, educators use the Essential Questions throughout the unit to sharply focus instruction and assessment.

Focus Standards: The most essential standards for students to master, the most critical outcomes of their learning experience. Focus Standards are "key learnings" that will prepare students for the next grade level.

Supporting Standards: Standards that support, connect to, and enhance the Focus Standards. They are taught within the context of the Focus Standards but do not receive the same degree of instruction and assessment emphasis.

