2017-2018
CPSD MATHEMATICS
PACING GUIDE

Foundations to Algebra

Canton Public School District
2017-2018 Pacing Guides

Frequently Asked Questions and Guidance

Frequently Asked Questions

1. **Where are the district's pacing guides located? What is their purpose?**

   Pacing guides for the 2017-2018 school year can be found on Canton Public School District's website under Teacher Resources. Pacing guides have been developed for grades K-12 in English Language Arts, Mathematics, Science, and Social Studies.

The district's pacing guides:

- ensure that instruction addresses all of the Mississippi College and Career Readiness Standards for English Language Arts and Mathematics and the Curriculum Frameworks for Social Studies and Science;
- provide consistency district-wide for the pace, rigor, and equity of standards; and,
- address student mobility and the need for uniformity of instruction.

2. **How were the pacing guides developed and by whom? What if I would like to suggest a change to the pacing guides?**

   The pacing guides were developed by teams of teachers with feedback from the district's content staff and administrators. District staff and teachers considered state standards and objectives, state assessment blueprints, and the district's calendar when developing the pacing guides.

   ELA and Mathematics content staff will consider changes to the pacing guides twice yearly (at the end of the first semester and at the end of the second semester of each school year). Administrators should compile their teachers' suggestions and submit them to the district's content staff during the week prior to Thanksgiving Break during the first semester and the week prior to the end of the school year during the second semester. **Revisions will only be considered during these windows**. If warranted, changes will be made to the pacing guides prior to the next semester.

3. **How are these pacing guides different from other pacing guides that we have used in the district?**

These pacing guides are different because the standards are paced by term rather than by day or week. This gives teachers more flexibility in deciding how and when to teach standards. This format also emphasizes the best practice of recognizing that many standards are ongoing and should be taught throughout the year.

4. What is the best way to interpret the pacing guides?

The pacing guides were developed to be easily understood. Quick explanations for English Language Arts and Mathematics are found below:

English Language Arts

Many of the standards in the College and Career Readiness Standards for English Language Arts are ongoing; in fact, most of them are. With that fact considered, the pacing guides for ELA indicate at what point during the year standards should be introduced (**I**), practiced (**P**), assessed (**A**), and mastered (**M**). Some standards may be assessed during the year to determine students' progress even though they may not be expected to master the standard until later. This reinforces the concept that we should frequently conduct formative assessments to inform instruction and determine which students are in need of intervention. Teachers should use the ***Scaffolding Document*** to assist in planning lessons and interventions.

Mathematics

The mathematics pacing guides are composed of the standards set forth by the state of Mississippi's College and Career Readiness Standards. Several of these standards are presented during a nine week period for mastery. The district will assess these standards for mastery at the end of the nine week period. District assessments will be comprehensive; therefore, these standards will also be assessed within future district assessments. The Pacing Guides give teachers a list of standards to be covered within a nine week period. The guides do not dictate the order or cluster of how the standards will be taught. Teachers should also use the ***Scaffolding Document*** to assist in planning lessons. Please note that there are several new standards added to the MS CCRS for Mathematics this year. These standards may not be found in your textbooks; therefore, these standards will be integrated within the curriculum with other standards that can be clustered together.

5. Are the pacing guides stand-alone documents?

No. The pacing guides are part of a collection of instructional documents to assist teachers in planning instruction and assessments. The other documents that should be used throughout the school year are the Pacing Planning Tool, Quick

Calendar, the College and Career Readiness Standards (or frameworks for subjects other than ELA and mathematics), and MDE's scaffolding documents for ELA and mathematics.

The Pacing Planning tool helps teachers make the broad vision of the standards more specific. The Quick Calendar provides teachers with a quick glance of what standards will be covered on any given day in a month. MDE's scaffolding documents for ELA and mathematics provide teachers with guidance on prerequisites for standard mastery, key concepts within standards, and examples of evidence of student mastery. These tools are excellent resources for planning lessons, developing assessments, and identifying points of intervention for struggling students.

The College and Career Readiness Standards and Curriculum Frameworks include the standards or objectives for each grade level as well as the standards or objectives for proceeding and following grade levels. The ELA and Mathematics College and Career Readiness Standards both contain glossaries of terms that are beneficial for teachers.

If you find that you need support in narrowing the focus of the pacing guides, please contact your principal. They have tools that can assist you in making the broad range of the term-based pacing guides more specific.

6. **Will the district's assessments be aligned to the standards in the pacing guides?**

   Our district assessments are designed to provide a snapshot of the learning process throughout the school year. The district's assessments are aligned with the timing and content of the pacing guides. Standards will be assessed according to their appearance within the term indicated on the pacing guide. Ongoing standards will be assessed at multiple points throughout the year.

7. **Whom should I contact if I need assistance with planning lessons using the pacing guides and supporting documents?**

   Teachers have several options for instructional support within the district. Building principals, instructional specialists, assistant principals, and district content coordinators are available to assist you with instructional planning.

Canton Public Schools'
Foundations to Algebra Pacing Guide, 2017 – 2018

1st 9 Weeks		
Standard	**Standard Description**	**ACE Module**
Quantities (N-Q)*		
Reason quantitatively and use units to solve problems.		
N.Q.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.*	1.2. 3.3
N.Q.2	Define appropriate quantities for the purpose of descriptive modeling.*	3.3
N.Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*	1.1 – 1-2
The Real Number System (N-RN)		
Extend the properties of exponents to rational exponents		
N-RN.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $[5^{1/3}]^3 = 5^{(1/3)\,3}$ to hold, so $[5^{1/3}]^3$ must equal 5.*	2.1-2.2
Seeing Structure in Expressions (A-SSE)		
Interpret the structure of expressions		
A-SSE.1	Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.*	3.1-3.3
A-SSE.2	Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$ thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$.*	3.2-3.3
Creating Equations (A-CED)*		
Create equations that describe numbers or relationships.		
A.CED.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.**	4.3
Reasoning with Equations and Inequalities (A-REI)		
Understanding solving equations as a process of reasoning and explain the reasoning.		

Solve equations and inequalities in one variable		
A.REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	4.1-4.2
Represent and solve equations and inequalities graphically		
A.REI.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	5.1
Interpreting Functions (F-IF)		
Understand the concept of a function and use function notation.		
F.IF.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*).	5.2
F.IF.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.*	5.3

ACE Modules 1-5

2nd 9 Weeks		
Standard	**Standard Description**	**ACE Modules**
Creating Equations (A-CED)*		
Create equations that describe numbers or relationships.		
A-CED.1	Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.**	10.5
Reasoning with Equations and Inequalities (A-REI)		
Solve systems of equations.		
A.REI.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	9.4
A.REI.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	9.1-9.3
Represent and solve equations and inequalities graphically		
A.REI.12	Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	7.4, 9.5
Interpreting Functions (F-IF)		
Interpret functions that arise in applications in terms of the context		
F.IF.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.**	6.4
F.IF.6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*	6.3
Analyze functions using different representations.		
F.IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.* a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	6.1-6.2
F-IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*	6.5

Building Functions (F-BF)		
Build a function that models a relationship between two quantities		
F-BF.1	Write a function that describes a relationship between two quantities.* a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*	7.2
F-BF.2	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*	7.1
Build new functions from existing functions.		
F.BF.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*	6.6, 10.4
F-BF.4	Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. *For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$*	7.3
Linear, Quadratic, and Exponential Models (F-LE) *		
Construct and compare linear, quadratic, and exponential models and solve problems		
F-LE.1	Distinguish between situations that can be modeled with linear functions and with exponential functions. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	10.2
F-LE.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*	6.7, 10.1, 10.3
S.ID.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.* a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.* b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	8.1-8.3

ACE Modules 6-10

3rd 9 Weeks		
Standard	**Standard Description**	**ACE Modules**
Seeing Structure in Expressions (A-SSE)		
Interpret the structure of expressions.		
A-SSE.1	Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients.	14.1
A.SSE.2	Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$ thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*	15.1-15.4
Arithmetic with Polynomials and Rational Expressions (A-APR)		
Perform arithmetic operations on polynomials		
A-APR.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	14.2-14.4
Linear, Quadratic, & Exponential Models (F-LE)*		
Construct and compare linear, quadratic, and exponential models and solve problems.		
F.LE.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.* a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	11.2
Interpreting Categorical and Quantitative Data (S-ID)		
Summarize, represent, and interpret data on a single count or measurement variable		
S-ID.1	Represent and analyze data with plots on the real number line (dot plots, histograms, and box plots).*	13.1, 13-3 13.4
S-ID.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.*	13.5
S-ID.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).*	13.2
Summarize, represent, and interpret data on two categorical and quantitative variables		
S.ID.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.*	12.1-12.2
S.ID.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.* a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given*	11.1

	functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	

ACE Modules 11-15

4th 9 Weeks		
Standard	**Standard Description**	**ACE Modules**
Reasoning with Equations and Inequalities (A-REI)		
Solve equations and inequalities in one variable		
A-REI.4	Solve quadratic equations in one variable. a. 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. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions.	16.1-16.6
Creating Equations (A-CED) *		
Create equations that describe numbers or relationships		
A-CED.1	Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	18.4
Building Functions (F-BF)		
Build new functions from existing functions		
F-BF.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*	17.1-17.2 18.3, 19.2 19.4
Interpreting Functions (F-IF)		
Interpret functions that arise in applications in terms of the context		
F-IF.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.**	17.4
Analyze functions using different representations		
F-IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.* a. Graph functions (linear and quadratic) and show intercepts, maxima, and minima. b. Graph square root and piecewise-defined functions, including absolute value functions.	17.3, 18.1-18.2 19.1, 19.3

Linear, Quadratic, and Exponential Models (F-LE) *		
Construct and compare linear, quadratic, and exponential models and solve problems		
F-LE.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.*	17.7
Reasoning with Equations and Inequalities (A-REI)		
Solve systems of equations		
A-REI.7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. *For example, find the points of intersection between the line y = -3x and the circle $x^2 + y^2 = 3$.*	17.6
Represent and solve equations and inequalities graphically		
A-REI.11	Explain why the *x*-coordinates of the points where the graphs of the equations *y* = *f*(*x*) and *y* = *g*(*x*) intersect are the solutions of the equation *f*(*x*) = *g*(*x*); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where *f*(*x*) and/or *g*(*x*) are linear, quadratic, absolute value, and exponential functions.*	17.5

Ace Modules 16-19

* Indicates Modeling Standards