Council of the Great City Schools

parent ROADMAP

SUPPORTING YOUR CHILD IN HIGH SCHOOL

ENGLISH LANGUAGE ARTS

America's schools are working to provide higher quality instruction than ever before.

The way we taught students in the past simply does not prepare them for the higher demands of college and careers today and in the future. Your school and schools throughout the country are working to improve teaching and learning to ensure that all students will graduate high school with the skills they need to be successful.

In English language arts and literacy, this means three major changes. Students will continue reading and writing. But in addition to stories and literature, they will read more texts that provide facts and background knowledge in areas including science and social studies. They will read more challenging texts and be asked more questions that will require them to refer back to what they have read. There will also be an increased emphasis on building a strong vocabulary so that students can read and understand challenging material.

What your child will be learning in high school English language arts and literacy

In high school, students will closely and critically read complex works of literature and informational texts. In writing and through class discussions, students will interpret what they read and present analysis based on appropriate examples and evidence from the text. They will assess the strength of an author's or speaker's points and assumptions based on evidence from the text. Additionally, students will expand their literary and cultural knowledge by reading great classic and contemporary works representative of various time periods, cultures, and worldviews. High school students will develop the skill, fluency, and concentration to produce high-quality writing, as well as the capacity to edit and improve their writing over multiple drafts. Here's a brief snapshot of some of the work students will be doing in these areas:

- Reading and analyzing foundational works of American and world literature and examining how two or more texts from the same time period treat similar themes or topics
- Citing strong evidence from a text to analyze what it says explicitly as well as what it infers, including determining when a text leaves a point unclear or unproven
- Identifying and evaluating the reasoning used in historical documents, including the application of constitutional or legal principles
- Supporting arguments in an analysis of challenging topics or texts using valid reasoning and relevant and sufficient evidence
- Conducting short- and long-term research projects to answer a question or solve a problem
- Participating effectively in group discussions, expressing ideas clearly and persuasively and building on the ideas of others
- Demonstrating understanding of complex or figurative language (such as hyperbole), and distinguishing what is directly stated in a text from what is actually meant
- Understanding the role that figurative language plays in a text
- Presenting information using multiple media formats (such as graphics or audio/visual presentations) to enhance understanding of findings, reasoning, and evidence

A hyperbole is an obvious exaggeration, such as "I waited for an eternity."

Here are just a few examples of how students will develop important literacy skills across grade levels as they read increasingly challenging works of literature.

READING LITERATURE

Grade Eight Reading	Grades Nine and Ten Reading	Grades Eleven and Twelve Reading
• Students determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot. • Students analyze how differences in the points of view of the characters and the audience or reader create such effects as suspense or humor.	• Students determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details. • Students analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States.	• Students determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account. • Students analyze a point of view by distinguishing what is directly stated in a text from what is really meant.

Sample Texts

In grades nine and ten, sample literary texts might include novels such as *The Grapes of Wrath* by John Steinbeck or poems such as "The Raven" by Edgar Allen Poe. In grades eleven and twelve, sample literary texts might include novels such as *The Great Gatsby* by F. Scott Fitzgerald or *Don Quixote* by Miguel de Cervantes, or poems such as "Ode on a Grecian Urn" by John Keats.

As they progress through grade levels, students will be asked more questions that require them to cite details or information from the texts they read. This will enable them to become observant and analytical readers.

Here are just a few examples of how students will develop important literacy skills across grade levels as they read increasingly challenging informational texts.

READING FOR INFORMATION

Grade Eight Reading	Grades Nine and Ten Reading	Grades Eleven and Twelve Reading
• Students cite evidence from the text that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. • Students evaluate the advantages and disadvantages of using different mediums (such as print or digital text, video, or multimedia) to present a particular topic or idea.	• Students cite strong and thorough textual evidence to support an analysis of what the text says explicitly as well as inferences drawn from the text. • Students analyze various accounts of a subject told in different mediums (such as a person's life story recounted in print, video, and multimedia), determining which details are emphasized in each account.	• Students cite strong and thorough textual evidence to support an analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain. • Students integrate and evaluate multiple sources of information presented in different media or formats (such as visually or through numbers) as well as in words in order to address a question or solve a problem.

Sample Texts

In grades nine and ten, sample informational texts might include historical documents such as "Letter from the Birmingham Jail" by Martin Luther King, Jr. or "Gettysburg Address" by Abraham Lincoln. In grades eleven and twelve, sample informational texts might include historical documents such as *Common Sense* by Thomas Paine, or social commentary such as "Politics and the English Language" by George Orwell.

Some reading guidelines may seem similar from year to year, but students will apply a greater depth of knowledge and growing sophistication in their analysis of increasingly challenging texts.

Writing tasks in high school may include literary analysis, research papers, creative writing, and essays. Here are just a few examples of how students will develop important writing skills across grade levels.

Grade Eight Writing

- Students introduce a topic clearly, previewing what is to follow, and develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information.
- Students provide a concluding statement or section that follows from and supports the information or explanation presented.
- Students organize ideas, concepts, and information into broader categories.
- Students use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
- Students use precise language and subject-specific vocabulary to inform the reader about or explain the topic.

Grades Nine and Ten Writing

- Students introduce a topic and develop it with well-chosen, relevant, and sufficent facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- Students provide a concluding statement or section that follows from and supports the information or explanation presented (such as articulating implications or the significance of the topic).
- Students organize complex ideas, concepts, and information to make important connections and distinctions.
- Students use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- Students use precise language and subject-specific vocabulary appropriate for the complexity of the topic.

Grades Eleven and Twelve Writing

- Students introduce a topic and develop it thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- Students provide a concluding statement or section that follows from and supports the information or explanation presented (such as articulating implications or the significance of the topic).
- Students organize complex ideas, concepts, and information so that each new element builds on what came before to create a coherent narrative.
- Students use appropriate and varied transitions and sentence structure to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- Students use precise language, subject-specific vocabulary, and writing techniques (such as the use of an analogy to illustrate a point) appropriate for the complexity of the topic.

Some writing guidelines may seem similar from year to year. However, with practice at each grade level, students continue to learn and apply the rules of standard written English and to strengthen and expand their vocabulary, use of language, and sophistication in the development and organization of ideas.

Helping your child learn outside of school

1. Increase time for conversation at home. Discuss classroom assignments, activities, and homework. Ask your child how he or she is doing in class and how you can help.
2. Ask your child about his or her academic goals and career interests. Assist in gathering various sources of information on college and career opportunities.
3. Begin to explore colleges and other postsecondary options that are of interest to your child.

Partnering with your child's teacher

Don't be afraid to reach out to your child's teacher—you are still an important part of your child's education. Ask to see samples of your child's work and discuss his or her progress with the teacher using questions like:

- Is my child becoming an effective writer?
- Is my child becoming more skilled at reading and understanding challenging material?
- What extra support can I provide at home to reinforce what you are teaching in class?
- How can I ensure that my child is developing good study habits for high school and beyond?

Additional Resources

For more information on the Common Core State Standards for English language arts and literacy, go to http://www.corestandards.org/about-the-standards/key-points-in-english-language-arts or http://www.commoncoreworks.org.

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SUPPORTING YOUR CHILD IN HIGH SCHOOL

MATHEMATICS

America's schools are working to provide higher quality instruction than ever before.

The way we taught students in the past simply does not prepare them for the higher demands of college and careers today and in the future. Your school and schools throughout the country are working to improve teaching and learning to ensure that all students will graduate high school with the skills they need to be successful.

In high school mathematics, the emphasis in instruction is on a few interrelated big ideas that connect the study of mathematics to science, technology, and engineering. Teachers will concentrate on teaching these big ideas using complex and challenging math content, enabling students to illustrate their thinking and apply their knowledge in many different ways. Students will learn how to use mathematics to analyze and respond to real-world issues and challenges, as they will be expected to do in college and the workplace.

What your child will be learning in high school mathematics

In high school, students will develop a deep understanding of mathematical concepts and use mathematical ways of thinking to solve real-world problems. Unlike previous grades where learning objectives are organized by grade level, high school learning objectives are organized by concepts—such as algebra, functions, or geometry—that students will learn and master in various mathematics courses. These concepts build on what students learned in grade eight and move toward greater depth of knowledge and skills throughout high school. Here's a brief snapshot of some of the work students will be doing in these areas:

- Creating and solving *equations* (mathematical statements that use letters to represent unknown numbers, such as 2x-6y+z=14) with two or more variables to describe numbers or relationships
- Building an understanding of *rational numbers* (such as ¾) to include *rational expressions* (such as 3/(x-4))
- Using the structure of an *expression* to identify ways to rewrite it. For example, recognizing that x^8-y^8 is the difference between two squares and can also be written $(x^4)^2$-$(y^4)^2$
- Adding, subtracting, and multiplying *polynomials* (an expression with multiple terms such as $5xy^2$+2xy-7)
- Interpreting the *slope* of a line as the rate of change in two variables and the *intercept* as the constant term in a *linear model*
- Building and analyzing *functions* that describe relationships between quantities and using *function notation* (for example, f(x) denotes the output of f corresponding to the input of x)
- Representing and performing operations with *complex numbers* (numbers such as 3+5*i*, where *i* is an imaginary number and $i=\sqrt{-1}$)
- Understanding the rules of *probability* and using them to interpret data and evaluate the outcomes of decisions
- Distinguishing between correlation and causation
- Interpreting quantitative and categorical data
- Understanding and proving geometric *theorems* (mathematical statements whose truth can be proven on the basis of previously proven or accepted statements)
- Using algebraic reasoning to prove geometric theorems
- Applying geometric concepts to model real-life situations

Complex numbers are used in many scientific fields, including engineering and quantum physics.

Here are just a few examples of how students will develop and apply an understanding of structure and patterns in algebraic expressions.

Grade Eight Mathematics

- Understand the connections between proportional relationships, lines, and linear equations
- Use linear equations to graph proportional relationships, interpreting the unit rate as the slope of a line
- Know and apply the properties of integer exponents (positive numbers, negative numbers, or 0) to write equivalent expressions (such as $4^2 \bullet 4^3 = 4^5$)

"•" is a multiplication symbol students use in grade eight and beyond

High School Mathematics

- Interpret the structure of an expression
- Use the structure of an expression to identify ways to rewrite it. For example, $x^4-y^4=(x^2)^2-(y^2)^2$
- Interpret one or more parts of an expression individually. For example, interpret $6+(x-2)^2$ as the sum of a constant and the square of x-2
- Solve quadratic equations (equations that include the square of a variable, such as $5x^2-3x+3=0$)
- Factor a quadratic expression to reveal the zeros of the function it defines
- Write expressions in equivalent forms to solve problems
- Use the properties of exponents to transform and evaluate expressions. For example, interpret $(8^{2/3})^2=(8^{1/3})^4 = 2^4=16$
- Derive the formula for the sum of a finite geometric series, and use the formula to solve problems. For example, 3, 12, 48, 192 is a finite series where the ratio between each term is 4; 12/3=48/12=192/48=4
- Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines

In grade eight, students solved real-world problems involving rates and discount, focusing on the computation needed to determine the final price. In high school, the emphasis is not about merely computing the final price, but rather using the structure of the answer to make a general argument.

Sample Problem

Judy is working at a retail store over summer break. A customer buys a $50 shirt that is on sale for 20% off. Judy computes the discount, then adds sales tax of 10%, and tells the customer how much he owes. The customer insists that Judy first add the sales tax and then apply the discount. He is convinced that this way he will save more money because the discount amount will be larger.

a. Is the customer right?

b. Does the answer to part (a) depend on the numbers used or would it work for any percentage discount and any sales tax percentage? Find a convincing argument using algebraic expressions and/or diagrams for this more general scenario.

Solution:

Judy's solution:

After the 20% discount, the shirt will cost 80% of the original price. 0.80($50)=$40

The tax will be 10% of this reduced price. 0.10($40)=$4

The final cost will be the reduced price plus tax. $40+$4=$44

The equation for finding this answer is $50(0.80)(1.10)=$44

Customer's solution:

Before the 20% discount, the shirt cost $50. The tax will be 10% of this price. 0.10($50)=$5

The cost before the discount would be price plus tax. $50+$5=$55

After the 20% discount, the shirt will cost 80% of this price. 0.80($55)=$44

The equation for finding this answer is $50(1.10)(0.80)=$44

In this problem, students apply their understanding that changing the order of quantities in a multiplication problem doesn't matter (known as the commutative property of multiplication). Students also show that given the structure of the equation used to find the answers, the answer would apply to any given combination of price, discount, and tax. For example, if we let P represent the original price, s represent the sale percentage, and t represent the tax percentage, students see that they can generalize the results.

Judy: $P(1-s/100)(1+t/100)$

Customer: $P(1+t/100)(1-s/100)$

Task adapted from www.illustrativemathematics.org.

Here are just a few examples of how students connect functions, algebra, and modeling to describe relationships between quantities.

Grade Eight Mathematics

- Understand that a function is a rule that assigns to each input exactly one output, and the graph of a function is a set of ordered pairs consisting of an input and a corresponding output
- Compare the properties of two functions each represented in a different way (for example, in a table, graph, equation, or description)
- Determine the rate of change and initial value of a function based on a description of a proportional relationship or of at least two given (x,y) values

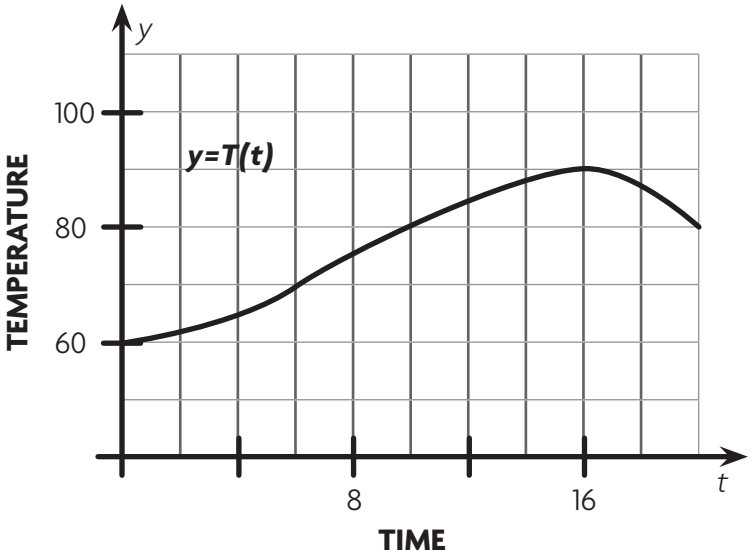
High School Mathematics

- Understand and use function notation (for example, f(x) denotes the output of f corresponding to the input of x)
- Interpret functions in terms of the context
- Calculate and interpret the average rate of change of a function presented in a graph or table over a given interval
- Graph functions symbolically and show key features of the graph, by hand or using technology (such as graphing calculators and computer programs) for more complicated cases
- Write a function defined by an expression in different but equivalent forms
- For a function that models a relationship between two quantities, interpret key features of graphs and tables, including intercepts, intervals where the function is increasing or decreasing, relative maximums and minimums, etc.
- Construct, compare, and apply linear, quadratic, and exponential models to solve problems

To promote fluency with functions representing proportional relationships, students begin by interpreting function notation in context. For example, if h is a function that relates Shea's height in inches to her age in years, then h(8)=50 means, "When Shea is eight years old, she is 50 inches tall."

Sample Problem

The figure shows the graph of T, the temperature (in degrees Fahrenheit) over one particular 20-hour period as a function of time t.



a. Estimate $T(14)$.

b. If $t=0$ corresponds to midnight, interpret what we mean by $T(14)$ in words.

c. From the graph, estimate the highest temperature during this 20-hour period.

d. If Anya wants to go for a two-hour hike and return before the temperature is over 80 degrees, when should she leave?

Solution:

In this task, $T(14)$ means that 14 hours after midnight, the temperature is a little less than 90 degrees Fahrenheit; $T(14)$ is 2:00 p.m. The highest temperature on the graph is about 90 degrees. The temperature was decreasing between 4:00 p.m. and 8:00 p.m. It might have continued to decrease after that, but there is no information about the temperature after 8:00 p.m. If Anya wants to go for a two-hour hike and return before the temperature is over 80 degrees, then she should start her hike before 8:00 a.m.

Note: This is a straight-forward assessment task of reading and interpreting graphs. It requires an understanding of function notation and reinforces the idea that when a variable represents time, $t = 0$ is chosen as an arbitrary point in time and positive times are interpreted as times that happen after that point.

Task adapted from www.illustrativemathematics.org.

Helping your child learn outside of school

1. Show your enthusiasm for your child's study of mathematics.
2. Encourage your child to be persistent; make sure that he or she knows that mathematics requires patience, practice, and time to think and reflect.
3. Urge your child to ask the teacher questions either during or after class.
4. Encourage your child to review class notes every night. If there is something he or she doesn't understand, tell your child to look at the answers and work backwards to determine how the solution was found.

Partnering with your child's teacher

Don't be afraid to reach out to your child's teacher—you are still an important part of your child's education. Ask to see samples of your child's work and discuss his or her progress with the teacher using questions like:

- Where is my child excelling? How can I support this success?
- What do you think is giving my child the most trouble? How can I help my child improve in this area?
- Are there options provided by the school for enrichment experiences in mathematics, science, technology, or engineering (STEM areas) or for students having difficulty in mathematics?
- Is there a homework hotline or some other resource outside of class for students to ask questions about their homework or what they are learning?

Additional Resources

For more information on the Common Core State Standards for mathematics, go to http://www.corestandards.org/about-the-standards/key-points-in-mathematics or http://www.commoncoreworks.org.

For more information about the progression of mathematical ideas go to www.illustrativemathematics.org.