Cliffside Park Public Schools

COURSE OF STUDY UNIT PLANNING GUIDE FOR:
Algebra 1

Grade Level:
8th or 9th

Cliffside Park School District
Cliffside Park, NJ 07010
www.cliffsidepark.edu

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Course Overview:

Algebra 1 course looks into the structure of expressions. Student learn how to interpret expressions and write equivalent forms to solve problems. Arithmetic operations are extended to polynomials and rational functions. The understanding of significant values such as the zeros and factors of polynomials is used throughout the course. Students create equations and define functions that model relationships between numbers. Students are expected to explain their reasoning when they obtain a solution or solve an equation or an inequality. Students are introduced to various representations of problems such as graphic, tabular and algebraic.

Overview of Units:

1. Modeling with Linear Equations and Inequalities

2. Modeling with Linear Functions, Linear Systems, & Functions

3. Quadratic Equations, Functions, and Polynomials

4. Modeling with Statistics

Unit 1 Algebra 1		
NJSLS-M Content & Practice Standards	**NJSLS-M Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS-Technology: 8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue. **Career Ready Practices:** CRP2. apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity	MP.3 Construct viable arguments & critique the reasoning of other MP4 Model with mathematics MP5. Use appropriate tools strategically MP.6 Attend to precision.	Students must learn to collaborate with others to perform specific tasks. Students must defend their answers with reason and communicate effectively. Students must be able to use technology effectively to find the correct answers and justify their claims.
• A.SSE.A.1. Interpret expressions that represent a quantity in terms of its context. A.SSE.A.1a. Interpret parts of an expression, such as terms, factors, and coefficients.	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively.	Concept(s): No new concept(s) introduced Students are able to: • identify different parts of an expression, including terms, factors and constants. • explain the meaning of parts of an expression in context. Learning Goal 1: Interpret terms, factors, coefficients, and other parts of expressions in terms of a context .

● A.CED.A.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.	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively.	Concept(s): Literal equations can be rearranged using the properties of equality. Students are able to: ● identify different parts of an expression, including terms, factors and constants. ● explain the meaning of parts of an expression in context. ● rearrange linear formulas and literal equations, isolating a specific variable. Learning Goal 2: Rearrange formulas to solve for a particular variable.
● A.REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. ● A.REI.A.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	MP 2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Properties of equality can be used to solve linear equations. Students are able to: ● solve linear equations with coefficients represented by letters in one variable. ● use the properties of equality to justify steps in solving linear equations.. Learning Goal 3: Solve linear equations and inequalities in one variable (including literal equations); justify each step in the process.-

● A.CED.A.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions and quadratic functions, and simple rational and exponential functions. ● A.REI.A.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.7 Look for and make use of structure.	Concept(s): ● Equations and inequalities describe relationships. ● Equations can represent real-world and mathematical problems. Students are able to: ● identify and describe relationships between quantities in word problems. ● create linear equations in one variable. ● create linear inequalities in one variable. ● use equations and inequalities to solve real world problems. ● explain each step in the solution process. Learning Goal 4: Create linear equations and inequalities in one variable and use them in contextual situations to solve problems. Justify each step in the process and the solution.
● A.CED.A.2. Create equations in two or more variables to represent relationships between quantities; Graph equations on coordinate axes with labels and scales. ● A.REI.D.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). [Focus on linear equations.]	MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.7 Look for and make use of structure.	Concept(s): ● Equations represent quantitative relationships. Students are able to: ● create linear equations in two variables, including those from a context. ● select appropriate scales for constructing a graph. ● interpret the origin in graphs. ● graph equations on coordinate axes, including labels and scales. ● identify and describe the solutions in the graph of an equation. Learning Goal 5: Create linear equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
● F.IF.B.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified	MP.1 Make sense of problems and persevere in solving them.	Concept(s): ● Scatter plots represent the relationship between two variables. ● solve problems using prediction equations. ● interpret the slope and the intercepts of the linear model in context.

interval. Estimate the rate of change from a graph. ● S.ID.C.7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Learning Goal 6: Interpret the slope, intercepts, and direction (increasing or decreasing)of a data set of a linear model;

Unit 1 Algebra 1 What This May Look Like	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards.	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.*
Teachers continually assess students understanding through Homework, classwork, teacher created quizzes and chapter tests.	Benchmark Assessment

Alternative Assessments
Journaling Problems worked out partially Using manipulatives to gauge understanding and develop reasoning skills Using questioning strategies in TE. Creating scaffolding questions on test Online tests Questions tied to Real-World scenarios Projects

Focus Mathematical Concepts
Districts should consider listing prerequisites skills. Concepts that include a focus on relationships and representation might be listed as grade level appropriate. Prerequisite skills: - Properties of Real Numbers - Operations with Fractions, Exponents, Square Roots - Operations with Positive and Negative Numbers - Percentages - Converting Percents into Fractions and Decimals - Solve One-Step Equations and Inequalities - Distributive Property Common Misconceptions: - Order of Operations (order from left to right) - Adding/Subtracting denominators of fractions instead of finding LCM - Operations with Negative and Positive numbers - Not Distributing Negative Sign

- Belief that x = 0 is not a solution to an equation
- Treating exponents as multiplication (i.e. $3^2 = 6$)

District/School Tasks	District/School Primary and Supplementary Resources
Benchmark Assessments End of Year Projects Conjecture, rule, solution, expression, identity, mean	Holt McDougal Algebra 1 Common Core Edition 2012 and online website. Big Ideas Algebra 1 (Honors classes) www.IXL.com www.Khanacademy.com www.desmos.com www.illustrativemathematics.org

Interdisciplinary Standards

Interdisciplinary Connections and Activities:

ELA

RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST.6-8.9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

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NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

WHST.6-8.1. Write arguments focused on discipline-specific content.
   A. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
   B. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.
D. Establish and maintain a formal/academic style, approach, and form.
E. Provide a concluding statement or section that follows from and supports the argument presented.

WHST.6-8.6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

W.11-12.2.D Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

NJSLS-Technology:
Students will use Desmos, GeoGebra or the TI-84 calculator to assist in graphing and analyzing these equations. They will discuss their findings with the instructor and their classmates. Students will participate in activities on Google Classroom and other online resources, Desmos. GeoGebra, IXL

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
8.1.12.A.4 Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all the worksheets to convey the results.

Career Ready Practices:

CRP2. Apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity

21st Century Life and Career:

9.1.12.B.6 Design and utilize a simulated budget to monitor progress of financial needs.
9.1.12.C.2 Compare and compute interest and compound interest and develop an amortization table using business tools.
9.1.12.C.3 Compute and assess the accumulating effect of interest paid over time when using a variety of sources of credit.

Integrated Differentiation/Accommodations/Modifications for Math Algebra 1 Unit 1 *(Alternate Modes of Instruction and Support)*		
Modifications to Support Gifted and Talented Students	**Modifications to Support English Language Learners**	**Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)**
Integrate Higher Order Thinking Skills (HOTS) through questioning and extension projects specific to linear equations, inequalities and functions

Provide menu of challenge activities for when the child finishes the lesson early (integrate technology when possible).

College/Career Readiness skill enhancement - G & T students can research professions related to the Algebra.

Have the student teach the lesson - peer tutoring (research-based strategy) Accelerate pace for students who are advanced in concepts.

Use inquiry-based, discovery learning approaches that emphasize open-ended problems with multiple solutions or multiple paths to solutions.

Allow students to design their own ways to find the answers to complex questions.

Leveled Questions assignments for classwork and homework. | **Concept/Idea Map** - teacher models note-taking on solving equations and inequalities, graphing equations and inequalities, linear functions and graphing functions.

Contextualize language for the following key vocabulary terms: **order of operations, variable, constant, numerical expression, algebraic expression, evaluate, equation, solution of an equation,expression, terms, factors, constants, identity, formula, absolute value, literal equation, inequality, solution to an inequality, compound inequality, intersection, union, compound inequality, continuous graph, discrete graph, function, relation, domain, range,independent variable, dependent variable, function rule, function notation, linear function, linear equation, x-intercept, y-intercept, rate of change; rise, run. slope, direct variation, constant of variation, parallel lines, perpendicular lines.**

Visuals and illustrations to be used for comprehension of graphs, online manipulatives, algebra tiles, and graphing calculators.
. | Review student individual educational plan and/or 504 plan for instructional, assessment, and environmental supports.

Allow student to use calculator to solve equations. Teach students how to check the accuracy of the solution that was derived from use of the calculation device.

Provide manipulatives to aid in solving equations and inequalities.

Utilize manipulatives and/or visuals within instructional presentation of solving equations and inequalities; graphing and understanding functions to support visual learners.

Provide graph paper to aid in aligning graphs and solving equations properly.

Utilize graphic organizer or partially completed template for students to solve equations or inequalities.

Provide study guides that are partially completed by teacher, allowing the student to fill in missing information during instruction in order to aid in obtaining information pertaining to unit 1.

Utilize visual aids such as charts or graphs connected to linear equations and inequalities and provide explicit instruction in how to analyze or use the data or information.

By utilizing individual student assessment results, the teacher will provide small group or remedial instruction to review |

Challenge Problems	**Word/picture bank** available for students' reference in text book, online and on teacher sites.	essential questions/big ideas of unit 1, to provide additional explanations, more examples, and to model procedures in completing solving equations and inequalities; graphing equations and inequalities; and solving problems using functions.
	Wait Time Two - extend basic "Wait Time" - after the 1st student responds to a question, the teacher waits an additional 5 - 7 seconds before calling on another student to ask a question about linear equations, inequalities or functions.	Provide wait time to allow students to process orally presented information and questions relating to the unit 1
	Native Language Supports (peer, online assistive technology, translation device, bilingual dictionary)	Access to word/picture banks to develop an understanding and use content-specific vocabulary, such as linear equation, solution to the equation, linear inequality,function or domain and range.
	Teach the text backward - **frontload** the concepts and vocabulary needed for learning the material and activating prior knowledge about solving equations and inequalities algebraically or by graphing.	Allow for Student Choice: Students should be permitted to demonstrate understanding of the unit 1 through drawings, computer projects, oral response, creating songs, creating videos, demonstration, presentation, etc.
	Use a **Frayer Model** to teach target academic vocabulary for the Unit 1.	Support comprehension of unknown vocabulary words by providing a method for the student to continue reading and not interrupt the books flow. Note-taking, highlighting, underlining, etc. should be allowed to be written on student copies of the actual textbook.
	Reading Strategies Worksheets Reteach Worksheets Leveled Practice Problems	Text to speech/Oral reading Provide students with flexible seating options while reading word problem, depending on need or preference.
		Unit 1-specific vocabulary and literary terms should be pre-taught before reading each section references or word problems. Multisensory methods will be utilized such as google images, gesturing, and meaningful movement.
		Allow extra time to complete class assignments
		Provide students with a sample problem or list of steps or procedures for multi-step problems for student to reference when solving independently.

		Reduce the number of assigned problems within seat work or homework.
		Provide additional set of materials or online access so that students can utilize resources at school and home.
		Provide study guide for students to review before quizzes and tests.
		Modify tests to address big ideas/essential questions of solving and graphing equations, inequalities and functions
		Reading Strategies Worksheets Reteach Worksheets Leveled Practice Problems