Expressions, Equations, & Inequalities

8th Grade

K-12 Math Institute

March 2nd, 2026

MATHEMATICS

STRATEGIC COMPETENCE: BALANCING THE HOW, WHY, AND WHEN.

COBB COUNTY SCHOOL DISTRICT | ONE TEAM.ONE GOAL. STUDENT SUCCESS.

Lesson 1.04: Solving Multi-Step Equations (with Variables on One Side Only)

Instructional Notes

In this learning plan, students will learn how to use opposite operations in order to solve equations with variables on the same side.

Lesson Description

Students will use opposite operations to solve multi-step equations with variables on one side.

Big Idea(s)/Topic(s)

- Writing and solving multi-step equations.

Suggested Learning Targets

- I can use algebraic reasoning in describing the solutions to linear equations.
- I can interpret and solve linear equations to model real-world situations.
- I can justify the steps to a linear equation.

Georgia Standard and Learning Objectives

- 8.MP.1. Make sense of problems and persevere in solving them.
- 8.MP.2. Reason abstractly and quantitatively
- 8.MP.3. Construct viable arguments and critique the reasoning of others.
- 8.MP.6. Attend to precision.
- 8.MP.7. Look for and make use of structure.
- 8.MP.8. Look for and express regularity in repeated reasoning

8.PAR.3 Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena.

- **8.PAR.3.3** Create and solve linear equations and inequalities in one variable within a relevant application.
- **8.PAR.3.4** Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality

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Background Knowledge

- Students should be able to solve one and two step equations from 6th and 7th grade.

Common Misconceptions

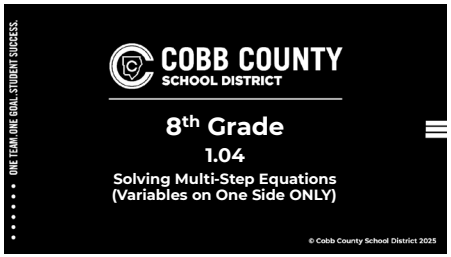
- Students will want to take pieces off the scale instead of attempting to keep it balanced.
- Many students may not have seen a balance scale and therefore will need an explanation of what they look like, how they work, and how they are used in everyday life (science) or historically (in the past).
- If using Algebra Tiles, students may have never seen them or have not used them since 7th grade so students may need a review on what each tile represents. Some students also believe the actual size of the algebra tiles matter when representing values

Materials Required

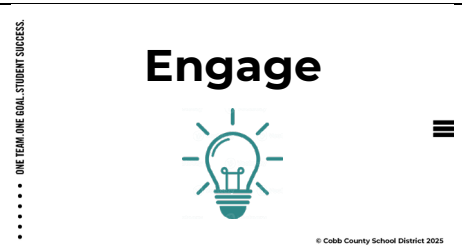
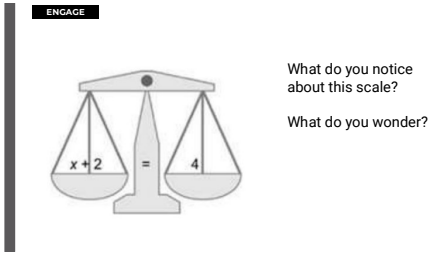
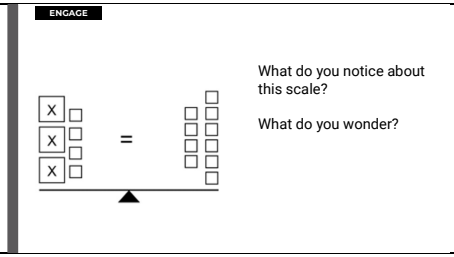
- Student page 1.04

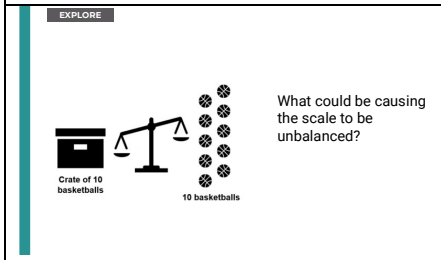
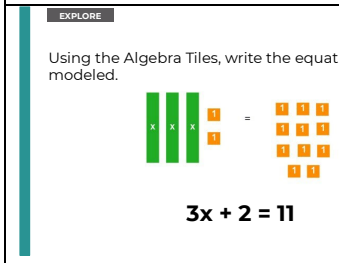
Lesson Details

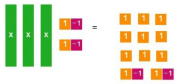
You, as the teacher, have the autonomy to adapt this lesson to best meet the needs of your students.

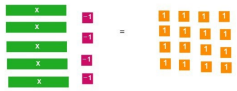
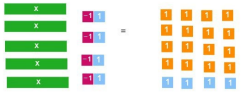
Section	Slide	*Implementation Guidance*	*Answer(s) if applicable*
Intro		This is the opening slide.	

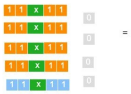
	Standards and Expectations 8.PAR.3 Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena. • 8.PAR.3.3 Create and solve linear equations and inequalities in one variable within a relevant application. • 8.PAR.3.4 Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality ONE TEAM. ONE GOAL. STUDENT SUCCESS. © Cobb County School District 2025	This slide provides the standard(s) and learning expectation(s) the lesson is aligned to.	
	Suggested Learning Target(s): • I can use algebraic reasoning in describing the solutions to linear equations. • I can interpret and solve linear equations to model real-world situations. • I can justify the steps to a linear equation. ONE TEAM. ONE GOAL. STUDENT SUCCESS. © Cobb County School District 2025	This slide provides learning targets aligned to the lesson. If you make adjustments to the content of the lesson, review learning targets for alignment Have a student read through the learning targets. Remind students of the goal for the lesson throughout the lesson.	
Diagnostic	**Diagnostic Assessment** © Cobb County School District 2025	Section Break	
	1. Based on this diagram, how much is one candy bar worth? Explain. CANDY BAR CANDY BAR 2. Based on this diagram, how much is one candy bar worth? Explain. CANDY BAR CANDY BAR CANDY BAR CANDY BAR © Cobb County School District 2025	This slide has two visuals for the students to try to determine what the cost of one candy bar is.	1. Candy Bar = $1 2. Candy Bar = $0.05
End		Section Break	

			
		Students will hopefully be thinking of ways to keep the scale balanced and how to determine what the value of x is.	Examples Responses: It is balanced. 2 can replace the x You can take 2 away from both sides
		On this slide there is more than one variable. So, after the students get rid of the unit squares, they will have to split up the remaining squares with the x's.	Example Responses: It is balanced. They both have 4 squares you can take away. It represents 3x + 4 = 10 x = 2

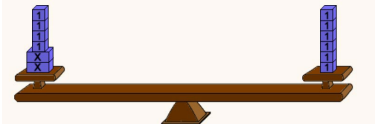
Explore		Section Break	
		This slide shows that one side has 10 basketballs and another side has a box of 10 basketballs but it is unbalanced.	The box weighs extra, so it is making it unbalanced.
		*Guidance: Teachers could use interactive Algebra Tiles (Polypad) in place of using the PowerPoint.* Students should identify there are 3 x's plus 2 on the left and 11 positive tiles on the right.	3x + 2 = 11

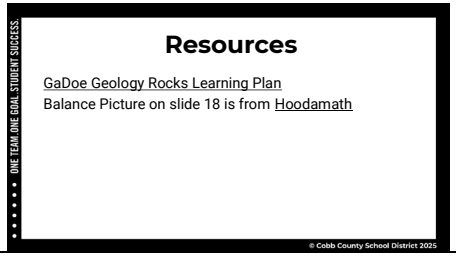
	EXPLORE Describe what operation is taking place.  **3x + 2 - 2 = 11 -2**	Encourage students to recognize that students need to subtract two from BOTH sides of the equation to keep it balanced.	3x + 2 – 2 = 11 - 9
	EXPLORE Write the new equation after combining the zero pairs.  **3x = 9**	Remind students on zero pairs and the purpose is to isolate the variables.	3x = 9
	EXPLORE Can you now divide the remaining tiles into 3 equal groups?  **3x = 9**	Ask students if they can DIVIDE the remaining tiles into 3 equal groups?	
	EXPLORE What does x equal?  **x = 3**	Students should now see visually there are 3 tiles in each x.	x = 3

	EXPLORE Using the Algebra Tiles, write the equation being modeled.  **5x – 4 = 16**	*Guidance: Teachers could use interactive Algebra Tiles (Polypad) in place of using the PowerPoint.* Students should identify there are 5 x's minus 4 on the left and 16 positive tiles on the right.	5x – 4 = 16
	EXPLORE Describe what operation is taking place.  **5x – 4 + 4 = 16 + 4**	Encourage students to recognize that students need to add four to BOTH sides of the equation to keep it balanced.	5x – 4 + 4 = 16 + 4
	EXPLORE Write the new equation after combining the zero pairs.  **5x = 20**	Remind students on zero pairs and the purpose is to isolate the variables.	5x = 20
	EXPLORE Can you now divide the remaining tiles into 5 equal groups?  **5x = 20**	Ask students if they can DIVIDE the remaining tiles into 5 equal groups?	

	EXPLORE What does x equal?  x = 4	Students should now see visually there are 4 tiles in each x.	x = 4
	EXPLORE **Birthday Party Planning**  It will cost $8.50 per person to get into the movies and $5 for each a piece of pizza per person. The total amount Tonya has to spend is $125. **How many people can she invite to go to the movies if each person will get one slice of pizza?**	This slide has students realizing that they will have one variable that is used twice in the equation. The variable will represent the number of people going to the movie. That variable will be used with the cost of the movie and for the cost of each pizza. Some students might keep them separate, but some students might decide to go ahead and combine them because they notice that it will cost $13.50 for each person attending the movie.	8.50x + 5x = 125 13.50x = 125 x = $9.\overline{259}$ Since the answer is not quite to 10, then the maximum number of people that can go to the movies is 9 (including her).
Apply	ONE TEAM. ONE GOAL. STUDENT SUCCESS. **Apply**  © Cobb County School District 2025	Section Break	

	APPLY Can you make a balance to represent this situation? How would you solve it? Mai made 50 flyers for five volunteers in her club to hang up around school. She gave 5 flyers to the first volunteer, 18 flyers to the second volunteer, and divided the remaining flyers equally among the three remaining volunteers. How many flyers did the remaining volunteers receive?	This slide gives a real-world situation for the students to try and solve. The numbers are larger, so if using manipulatives, you might want to use some base 10 blocks instead of counting out 50 unit squares. Students might also start seeing how equations could be written for these or use numbers on their balance.	This is the equation version of the answer. 5 + 18 + 3x = 50 23 + 3x = 50 3x = 27 x = 9 Each of the remaining volunteers received 9 flyers.
	APPLY Can you make a balance to represent this situation? How would you solve it? To thank her five volunteers, Mai gave each of them the same number of stickers. Then she gave them each two more stickers. Altogether, she gave them a total of 30 stickers. How many stickers did each volunteer get?	This situation is to help the students see that known amount (the 5 sets of 2) can be taken away first and then they can split up what remains for the 5 volunteers. Students might try to say that there is 5x and 2x. This would be a good time to explain that a variable represents and unknown and when she gave them each two more, there is not an unknown which is why it is not represented with 2x but instead with 5(2).	This is the equation version of the answer: 5x + 5(2) = 30 5x + 10 = 30 5x = 20 x = 4 Each volunteer got 4 stickers.
	APPLY Can you make a balance to represent this situation? How would you solve it? Mai distributed another group of flyers equally among the five volunteers. Then she remembered that she needed some flyers to give to teachers, so she took 2 flyers from each volunteer. Then, the volunteers had a total of 40 flyers to hang up. How many flyers did each volunteer receive this time?		This is the equation version of the answer: 5x – 5(2) = 40 5x – 10 = 40 5x = 30 x = 6 Each volunteer got 6 flyers.

Reflect	ONE TEAM.ONE GOAL. STUDENT SUCCESS. **Reflect**  © Cobb County School District 2025	Section Break	
	REFLECT How does balancing a scale relate to solving a linear equation?	This slide will allow students to discuss that an equal sign is just like the middle of a balance. What happens to one side must happen to the other side. Also, that sometimes-multiple moves have to be made to make it balanced.	Key words to listen for: Balanced Both sides Multiple Steps
	REFLECT What equation could be used to represent this balanced equation? 	This side specifically asks the students to create an equation that would represent what they see on the scale. If they want to and have time, they can also keep going and solve for the variable.	2x + 4 = 6 x = 1

Closing		Resources.	

Supports	Establish mathematics goals to focus learning. ● Supporting the Learning: The teacher will ensure the instructions and expectations are clear for this lesson on solving equations. The teacher will make explicit connections between current and prior lessons or units that the students have had with solving equations including the connections between variables, algebraic expressions, and constants. Implement tasks that promote reasoning and problem solving. ● Supporting the Learning: The teacher will provide opportunities to solve equations that build upon and extend prior knowledge. Use and connect mathematical representations. ● Supporting the Learning: The teacher will use think aloud strategies to make connections between mathematics concepts in order for the students to be able to solve all equation types. ● Supporting the Learning: The teacher may want to allow students time to explore and share their thoughts within their groups about how they are using the manipulatives to help them solve the equations. After you have given students time to explore, ask the groups to share their answers with the class. ● Language Support: The teacher will model the use of the language of mathematics in their oral response as well as how to claim an answer and support it. Pose purposeful questions. ● Supporting the Learning: The teacher will ask probing questions to elicit conceptual understanding of the mathematical procedures: ○ How do you determine your answer is correct and makes sense? ○ What is the purpose of the equal sign? G○ How does using inverse operations help in solving equations? Build procedural fluency from conceptual understanding. ● Supporting the Learning: The teacher will have students share with the class any strategies they came up with that make it quicker to solve the problems without creating a manipulative representation each time. Students may have realized that you are subtracting or adding a constant, and then dividing by the coefficient of x. Discuss with students the steps involved in solving these equations. ● Extending the Learning: Extend this activity to include equations involving negative and non-integral unknowns. For example, $4x - 4 = x + 3$ or $-4x + 12 = x - 3$. Support productive efforts of learning in mathematics. ● Supporting the Learning: The teacher will offer outlines and other scaffolding tools and share tips that might help students learn. The teacher will provide feedback using the feedback feature within activities and offer corrective opportunities. The

	teacher will consider the pacing of the lesson and align it appropriately to students and circumstances (i.e. school schedule and timing). Elicit and use evidence of student thinking. ● Supporting the Learning: The teacher will need to anticipate any misconceptions or questions students might have about the task, materials, or technology. The teacher will need to proactively address the misconceptions with readily available and accessible resources, then use student responses to guide further instruction.
Extensions	• Extending the Learning: The teacher could allow students to create their own representation of the situation with the chips, which will help ensure that each student understands the problem. After 30 seconds or so, they can pair-share to correct any problems with their representations and discuss their solutions. Facilitate meaningful mathematical discourse.
Additional Resources	

1.04 Solving Multi-Step Equations (Variables on One Side Only)

Name: _____ Date: _____

Solve each of the following equations.

1. $20 + y - 2y = -14$

2. $5x + 3x + 80 - 9x = -75$

3. $6b - 2 - 3b = 10$

4. $3 = 5a - 4 - 2a$

5. $3(k - 4) - 2k = 4$

6. $3(c + 5) - 4c - 4 = 6$

Write the equation that represents the following scenarios and solve the equation.

7. Latisha is saving money to buy a gift for a friend. Latisha currently has saved $40 and is working this weekend. If Latisha earns $10 per hour at work and needs $90 for the gift, how many hours will Latisha need to work?

8. James is collecting litter in a nearby park. So far, James has 20 kilograms of litter collected. James will be collecting for 4 more hours. In the end, James collects 120 kilograms of litter. If James collected the same amount each hour, how much litter did he collect each hour?

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COBB COUNTY SCHOOL DISTRICT

8th Grade

1.04

Solving Multi-Step Equations (Variables on One Side ONLY)

1

ONE TEAM. ONE GOAL. STUDENT SUCCESS.

Standards and Expectations

8.PAR.3 Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena.

- 8.PAR.3.3 Create and solve linear equations and inequalities in one variable within a relevant application.
- 8.PAR.3.4 Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality

2

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Suggested Learning Target(s):

- I can use algebraic reasoning in describing the solutions to linear equations.
- I can interpret and solve linear equations to model real-world situations.
- I can justify the steps to a linear equation.

3

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Diagnostic Assessment

4

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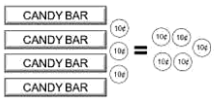
1. Based on this diagram, how much is one candy bar worth? Explain.

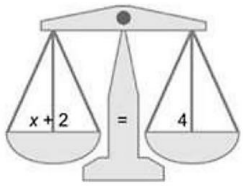
2. Based on this diagram, how much is one candy bar worth? Explain.



5

ENGAGE

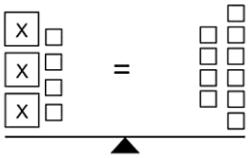
What do you notice?
What do you wonder?



6

ENGAGE

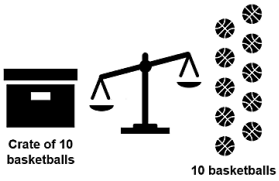
What do you notice about this scale? What do you wonder?



7

EXPLORE

What could be causing the scale to be unbalanced?



8

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Birthday Party Planning

It will cost $8.50 per person to get into the movies and $5 for each a piece of pizza per person. The total amount Tonya has to spend is $125.

How many people can she invite to go to the movies if each person will get one slice of pizza?

9

APPLY

Can you make a balance to represent this situation? How would you solve it?

- Mai made 50 flyers for five volunteers in her club to hang up around school. She gave 5 flyers to the first volunteer, 18 flyers to the second volunteer, and divided the remaining flyers equally among the three remaining volunteers.
- How many flyers did the remaining volunteers receive?

10

APPLY

Can you make a balance to represent this situation? How would you solve it?

- To thank her five volunteers, Mai gave each of them the same number of stickers. Then she gave them each two more stickers. Altogether, she gave them a total of 30 stickers.
- How many stickers did each volunteer get?

11

APPLY

Can you make a balance to represent this situation? How would you solve it?

- Mai distributed another group of flyers equally among the five volunteers. Then she remembered that she needed some flyers to give
- to teachers, so she took 2 flyers from each volunteer. Then, the volunteers had a total of 40 flyers to hang up.
- How many flyers did each volunteer receive this time?

12

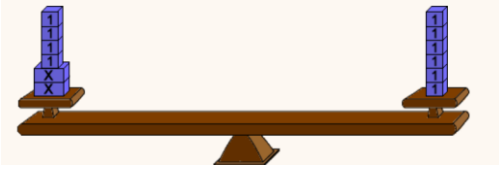
REFLECT

How does balancing a scale relate to solving a linear equation?

13

REFLECT

What equation could be used to represent this balanced equation?



14

Resources

GaDoe Geology Rocks Learning Plan
Balance Picture on slide 18 is from Hoodamath

15

Expanded Framework

8th Grade Mathematics

Unit 1

Rationale: The Cobb County School District's K–12 Teaching & Learning Frameworks provide a clear, standards-aligned structure to support high-quality instruction across each content area. Each framework outlines a coherent yearlong sequence of instruction designed to ensure students engage with all grade-level standards through intentionally developed units, research-based instructional practices, and purposeful use of core instructional materials.

The K–12 Expanded Unit Frameworks support instructional planning by serving as a core planning document for each unit. Each framework includes the unit focus/theme, key learning resources/texts, suggested pacing, and key academic vocabulary. This provides teachers with a clear and comprehensive guide for delivering focused, standards-based instruction. In addition to PDF versions posted in CTLS, Expanded Unit Frameworks are also available as editable Word documents. These versions may be downloaded and customized by CCCs to support collaborative planning and instructional alignment.

MATHEMATICS

STRATEGIC COMPETENCE: BALANCING THE HOW, WHY, AND WHEN.

MATHEMATICS

8th Grade Mathematics Expanded Framework

Unit 1 – Investigating Linear Expressions, Equations, and Inequalities in One Variable

6 weeks (30 instructional Days)

Standard(s):	Expectations:
• **8.PAR.3** Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena. Click here for a video overview of this standard. Click here for the ALDs.	• **8.PAR.3.1** Interpret expressions and parts of an expression, in context, by utilizing formulas or expressions with multiple terms and/or factors. • **8.PAR.3.2** Describe and solve linear equations in one variable with one solution (x = a), infinitely many solutions (a = a), or no solutions (a = b). Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). • **8.PAR.3.3** Create and solve linear equations and inequalities in one variable within a relevant, real-life application. • **8.PAR.3.4** Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality. • **8.PAR.3.5** Solve linear equations and inequalities in one variable with coefficients represented by letters and explain the solution based on the contextual, mathematical situation. • **8.PAR.3.6** Use algebraic reasoning to fluently manipulate linear and literal equations expressed in various forms to solve relevant, mathematical problems.

Suggested Learning Arc by Topic

#of Days	Topic	Lessons
3	Interpret Expressions 8.PAR.3.1	• Day 1: Parts of Expressions Vocabulary & Evaluating Expressions • Day 2: Simplifying Expressions • Day 3: Translating Expressions
4	Create and Solve Linear Equations Using Algebraic Properties	• Day 4: Solving Multi-step Equations (Variables on One Side ONLY) • Day 5: Introduction to Algebraic Properties • Day 6: Justifying Equations using Algebraic Properties (Day 1)

	8.PAR.3.4	• Day 7: Justifying Equations using Algebraic Properties (Day 2)
8	Create, Solve, and Describe Linear Equations, Including Infinitely Many Solutions and No Solutions 8.PAR.3.2 8.PAR.3.3	• Day 8: Solving Equations with Variables on Both Sides – One Solution (Day 1) • Day 9: Solving Equations with Variables on Both Sides – One Solution (Day 2) • Day 10: Justifying Equations with Variables on Both Sides using Algebraic Properties (One Solution) • Day 11: Classifying Solutions (Day 1) • Day 12: Classifying Solutions (Day 2) • Day 13: Classifying Solutions (Day 3) • Day 14: Create and Solve Linear Equations • Day 15: More Create and Solve Linear Equations
3	Literal Equations 8.PAR.3.5 8.PAR.3.6	• Day 16: Moving Things Around • Day 17: Solving Multi-Step Literal Equations • Day 18: Solving Literal Equations with Variable Coefficients
5	Create and Solve Inequalities Using Algebraic Properties 8.PAR.3.3	• Day 19: Solve and Graph Multi-Step Inequalities Day 1 • Day 20: Solve and Graph Multi-Step Inequalities Day 2 • Day 21: Justifying Inequalities using Algebraic Properties (all types) • Day 22: Create and Solve Linear Inequalities • Day 23: Create and Solve Linear Inequalities
7	Compound Inequalities 8.PAR.3.3	• Day 24: Graphing Basic Compound Inequalities • Day 25: Writing Basic Compound Inequalities from a Graph • Day 26: Solve and Graph Compound Inequalities from a Graph (Day 1) • Day 27: Solve and Graph Compound Inequalities from a Graph (Day 2) • Day 28: Solve and Graph Compound Inequalities from a Graph (Day 3) • Day 29: Create, Solve, and Graph Compound Inequalities • Day 30: Summative Assessment

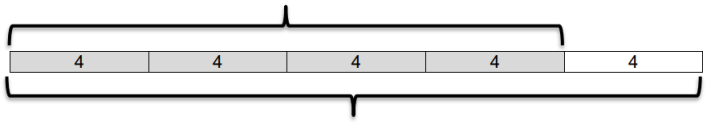
Suggested Vocabulary

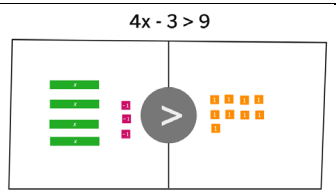
Tier 2 – sophisticated and cross-content words			Tier 3 – math-specific words		
• Analyze • Arrange • Categorize • Conclude	• Demonstrate • Describe • Differentiate • Evaluate	• Justify • Rewrite • Simplify • Substitute	• Addition Property of Equality • Additive Inverse Property	• Equivalent equation • Factors • Inverse operations	• Multiplicative Inverse Property • Rational

• Connect • Constant • Create	• Explain • Expression • Formula • Inequality • Interpret	• Solve • Solutions • Terms	• Coefficients • Compound Inequality • Division Property of Equality • Equation	• Linear equation (in one variable) • Linear inequality (in one variable) • Literal equation • Multiplication Property of Equality	• Reflexive Property of Equality • Subtraction Property of Equality • Variable

Suggested Instructional Considerations

Concept	Manipulatives/Visuals	Strategies
Interpret Expressions	• Use algebra tiles as support for simplifying expressions with multiple terms and/or factors.	• Provide multiple opportunities for students to write expressions that model real situations. • Refresh prior knowledge of the vocabulary of the parts of an expression. • KWL or Frayer model for vocabulary: terms, factors, coefficients, and operations. • Students will extend their knowledge of expressions to more complex expressions with multiple terms and/or factors.
Create and Solve Linear Equations Using Algebraic Properties	• Use Algebra tiles and Algebra mat or use Polypad or Didax to solve visually. Have students write down the steps out as they use the tiles. 3x + 8 = x + 12 	• Provide multiple opportunities for students to write equations that model real situations. • Students should justify their own steps, or if given two or more steps of an equation, explain the progression from one step to the next using properties. • Students should use algebraic reasoning in their descriptions of the solutions to linear equations. • Building upon skills from grade 7, students combine like terms on the same side of the equal sign and use the distributive property to simplify the equation when solving. Emphasis in this standard is also on using rational coefficients.

	• Provide students with the opportunity to use bar models or tape diagrams to reason mathematically. For example, students may use bar models or tape diagrams in order to gain a better understanding of a situation. $\frac{4}{5}(x+27)=16$ Students can view this equation as $\frac{4}{5}$ of "something" is 16 and reason with a model.  20 The student recognizes that the "something" also represents 20, so $x+27=20$ and x must equal -7. • Students should use algebraic reasoning to solve linear equations in one variable.	
Create, Solve, and Describe Linear Equations, Including Infinitely Many Solutions and No Solutions	• Use Algebra tiles and Algebra mat or use Polypad or Didax to solve visually. Have students write down the steps out as they use the tiles. • Use a graphic organizer to help with the different categories of solutions (or no solutions). Include examples of each, visuals, etc.	• Students should use algebraic reasoning in their descriptions of the solutions to linear equations. • Building upon skills from grade 7, students combine like terms on the same side of the equal sign and use the distributive property to simplify the equation when solving. Emphasis in this standard is also on using rational coefficients. • Solutions of certain equations may elicit infinitely many or no solutions.
Literal Equations	• Use common formulas to solve for other variables. • Help students track steps and understand which parts of the equation are being manipulated by using color pencils or highlighters. • Use Algebra tiles and Algebra mat or use Polypad or Didax to solve visually. Have students write down the steps out as they use the tiles. • Use a graphic organizer to help to connect literal equations to linear equations. Include examples of each, visuals, etc.	• To achieve fluency, students should be able to choose flexibly among methods and strategies to solve mathematical problems accurately and efficiently. • Students should rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations. Interpret and explain the results.
Create & Solve Linear Inequalities Using Algebraic Properties	• Use Algebra tiles and Algebra mat or use Polypad or Didax to solve visually. Have students write down the steps out as they use the tiles. • Students are building from 6^{th} and 7^{th} grade. This progression will include variables on both sides.	• Relate to speed zones, amusement park height requirements, states of matter, etc. • Provide scaffolding by providing contextual situations for one-step and two-step equations and inequalities.

	 • Testing solutions to see if they are "true" or work, should be done to ensure the problems were set up correctly. Does the answer make sense? • Students should use algebraic reasoning to solve linear inequalities in one variable.	• Students should justify their own steps, or if given two or more steps of an inequality, explain the progression from one step to the next using properties.
Compound Inequalities	• Testing solutions to see if they are "true" or work, should be done to ensure the problems were set up correctly. Does the answer make sense? • Use a graphic organizer to help with the different categories of solutions (and vs. or). Include examples of each, visuals, etc.	

Progress Monitoring & Assessments

Prerequisite	Evidence of Student Learning
Prerequisite skills assessments determine students' readiness to begin a unit by assessing how well they retained previous grade-level content directly related to the concepts in the unit. 8th Grade Unit 1 Prerequisite Skills Inventory 2023.docx Georgia Learning Progressions	The Evidence of Student Learning is a collection of assessment items aligned to the standards for teachers to use as a backwards design element when planning. Questions can be pulled to make summative assessments, formative assessments, informal exit tickets, etc.

Student Supports

Language Supports	Grade 8 Mathematics Resource Companion for Language Supports
	
	Provide extended opportunities for ELs to practice Listening, Speaking, Reading, and/or Writing throughout each lesson (4 domains of language)
	
	Provide extended opportunities for ELs to use language by Informing, Explaining, and/or Arguing (WIDA ELD Standards, Key Language Uses)
	
	Additional language supports can be found in Elevation Activities
	
	Vocabulary (Develop Academic Language)
	• Word Walls
	  ○ *Example: Teach unit vocab such as: coefficient, equation, like terms, linear expression, solution, term, unit rate, and variable. This interactive activity increases comprehension, interaction, and oral fluency while providing an opportunity for students to create personalized word walls for ongoing reference.*
	Explore (Clarify Input)
	• Anchor Charts
	  ○ *Example: Co-create an anchor chart for solving pairs of simultaneous linear equations both algebraically and by graphing. Outline the steps for using the elimination method, substitution method, and geometric or graphical interpretation. Prepare input/output tables and sample equations such as: 2x-y=-1 and y=5x-5 to use as examples. Students will complete a personalized version of the anchor chart in their notebook to use as a reference.*
	Apply (Foster Interactions / Fortify Output)
	• Fortune/Misfortune
	  ○ *Example: Give students a word problem that describes an inequality in the form of px + q > r. For example: "Bob the salesperson, is paid $50 per week plus $3 per sale. This week he needs to make at least $100 to buy a great pair of shoes." Students write and graph the inequality. Students identify a variable that will lead to a fortunate or unfortunate outcome for Bob and write a short description of the outcome, explaining why the variable they chose led to the two results.*
	Reflect (Assess Language & Learning)
	• Proud Portfolios
	  ○ *Example: In their portfolio, students must have one correctly solved algorithm and artifact for each topic covered during the unit. Download the reflection format for this activity and have students explain how their algorithm and artifacts are related.*

Intervention	

Scaffolding: *Just like a physical scaffold supports a building under construction, educational scaffolding supports the learner until they can stand on their own. The assistance is gradually withdrawn as the student gains proficiency, ultimately leading to independent mastery.*

Key Characteristics

- **Temporary Support:** The help is not permanent. It's designed to be removed once the student can perform the task independently.
- **Adjustable:** The level of support is adjusted based on the student's needs. Beginners might need more explicit guidance, while those with some understanding might only need subtle prompts.
- **Enables Independence:** The goal is to empower students to solve problems and understand concepts without assistance.
- **Focus on the Zone of Proximal Development (ZPD):** Scaffolding operates within Vygotsky's ZPD, which is the gap between what a student can do independently and what they can achieve with guidance.

Here are some ways scaffolding is applied in a math classroom:

- **Breaking Down Complex Problems:** A teacher might break a multi-step word problem into smaller, manageable parts.
- **Providing Graphic Organizers:** Using diagrams, charts, or flowcharts to help students organize information and visualize problem-solving steps.
- **Using Manipulatives:** Concrete objects like blocks, counters, or fraction tiles can help students understand abstract mathematical concepts.
- **Think-Alouds:** The teacher verbalizes their thought process while solving a problem, demonstrating strategies and reasoning.
- **Providing Sentence Starters or Prompts:** Offering phrases like "First, I need to..." or "What information is given?" to guide students' thinking.
- **Worked Examples:** Presenting fully solved problems that students can reference as they work on similar ones.
- **Checklists or Rubrics:** Giving students a clear set of criteria for completing a task or solving a problem.

By providing timely and appropriate support, scaffolding helps students build confidence and develop a deeper understanding of mathematical concepts.

Differentiation: *Differentiation is about customizing instruction to meet each student's unique learning needs, while also providing opportunities for those who are ready for more advanced challenges. This approach recognizes the diverse needs of students in a classroom*.

Here are strategies for differentiated instruction that we can use to meet the diverse needs of our students:

- **Integrate Low Floor, High Ceiling Tasks:** These tasks have a low barrier to entry to be accessible to all (low floor), but they also offer opportunities for deeper exploration and advanced challenges (high ceiling). This strategy ensures that every student can engage with the material while also allowing those ready for more complexity to thrive. Most math tasks can be revised to have a low floor, high ceiling by removing numbers, allowing students to use their own models rather than dictating which methods to use, or providing alternative directions for existing assessments.
- **Introduce Manipulatives**: They're not just for elementary students! Using hands-on tools can also help older students understand abstract concepts. Manipulatives can increase engagement and allow students to explore ideas and grasp subjects like math and science more effectively. Think rotating a physical object before graphing, using algebra tiles to solve for x, or placing an unknown number of objects in a box to make connections with variables.
- **Assemble Small Groups:** Breaking the class into smaller groups allows for more targeted instruction. Educators can address specific needs, answer questions, and provide targeted assistance to students based on their progress and needs.
- **Provide Student Choice:** Offering students choice in their learning empowers them. Students can choose topics, projects, or assignments that align with their interests, making the learning experience more engaging and relevant. Choice boards, for example, provide students with activity and assessment options and can be used across subject areas.
- **Use Graphic Organizers:** Not only are graphic organizers useful visual tools for organizing complex information, but they can also assist students in understanding the information. Organizers can be used for learning a range of subjects.

Metacognitive Strategies

*Metacognitive strategies for middle school math students are techniques they use to **think about their thinking** while learning and problem-solving. These strategies help students become more aware of their own learning processes, identify what they understand and what they don't, and take steps to improve their comprehension and performance.*

Before Solving a Problem

- **Understanding the Task:**
  - **Activating Prior Knowledge:** "What do I already know about this type of problem?" or "Have I seen a similar problem before?"
  - **Deconstructing the Prompt:** "What is the question really asking me to do?" or "What are the key terms and information given?"
  - **Goal Setting:** "What am I trying to achieve by solving this problem?"
- **Planning:**
  - **Strategy Selection:** "What strategies could I use to solve this (e.g., drawing a diagram, making a list, using a formula)?"
  - **Predicting Outcomes:** "What do I expect the answer to look like?" or "Does this problem seem simple or complex?"

- **Resource Identification:** "What tools or resources might I need (calculator, notes, textbook)?"

During Problem Solving

- **Monitoring Comprehension:**
  - **Self-Questioning:** "Am I understanding each step?" or "Does this make sense so far?"
  - **Checking Progress:** "Am I on the right track?" or "Is my current step leading me closer to the solution?"
  - **Identifying Obstacles:** "Where am I getting stuck?" or "What part is confusing me?"
  - **Re-reading/Re-evaluating:** "Should I go back and re-read the problem or my notes?"
- **Adapting and Adjusting:**
  - **Strategy Shifting:** "If this strategy isn't working, what else could I try?"
  - **Error Detection:** "Did I make any calculation errors?" or "Is there a mistake in my reasoning?"
  - **Seeking Help (Strategically):** "When should I ask for help, and what specific question should I ask?"

After Solving a Problem

- **Evaluating Performance:**
  - **Checking Solutions:** "Does my answer make sense in the context of the problem?" or "Is my answer reasonable?"
  - **Verifying Accuracy:** "Can I double-check my calculations?" or "Is there another way to solve this to verify my answer?"
- **Reflecting on Learning:**
  - **Self-Assessment:** "What did I do well in solving this problem?" or "What could I have done differently?"
  - **Generalizing:** "What did I learn from solving this problem that I can apply to future problems?"
  - **Identifying Areas for Improvement:** "What concepts do I still need to practice or understand better?"
  - **Summarizing Learnings:** "How would I explain this problem and its solution to someone else?"

Georgia Numeracy Project Support Activities

- GloSS/IKAN Activities & Resources (3-8)

Concrete – Representational – Abstract Supports

- CRA

Word Problem Supports

- Schema Based Instruction (word problems)
- 3-Read Protocol

Visual Representations

- Math is Visual

Number Talks

- Secondary Math Talks

Standards	Learning Objectives	Name of Intervention Task/Activity	Skills Addressed
8.PAR.3	8.PAR.3.1 8.PAR.3.3	Choices	Solve linear equations and inequalities
	8.PAR.3.3 8.PAR.3.4	Field Trip to the Orchard	
	8.PAR.3.3 8.PAR.3.6	Food for Thought: Using Equations	

8.PAR.3.1 – Interpret expressions and parts of an expression

Activity: Expression Breakdown Relay

- **How it works**: Create cards with multi-term expressions (e.g., (3x^2 + 5x - 7)). Students work in teams to break down each part (coefficient, variable, constant, term) and explain its meaning in a real-world context (e.g., area, cost).
- **Intervention Focus**: Helps students see structure and meaning in expressions.

8.PAR.3.2 – Solve linear equations with one, infinite, or no solutions

Activity: Equation Sort & Justify

- **How it works**: Provide a mix of equations. Students sort them into categories: one solution, no solution, or infinite solutions. Then, they must transform each equation step-by-step and justify their reasoning.
- **Intervention Focus**: Builds fluency in identifying solution types and strengthens algebraic manipulation.

8.PAR.3.3 – Create and solve linear equations/inequalities in real-life contexts

Activity: Math in My Life

- **How it works**: Students write a short story problem from their own life (e.g., saving money, buying snacks) and create a linear equation or inequality to represent it. Then, they solve and explain.
- **Intervention Focus**: Connects math to students' lives, making it more meaningful and easier to grasp.

	8.PAR.3.4 – Justify steps using algebraic and real number properties **Activity: Justify the Journey** • **How it works**: Give students a solved equation with each step shown. Their task is to label each step with the property used (e.g., distributive, inverse, identity). • **Intervention Focus**: Reinforces understanding of why each step is valid, not just how to solve. **8.PAR.3.5 – Solve equations with coefficients as letters** **Activity: Literal Equation Puzzle** • **How it works**: Provide literal equations (e.g., (A = lw), (d = rt)) and ask students to solve for a specific variable. Then, match the rearranged formula to a real-world scenario. • **Intervention Focus**: Builds comfort with abstract reasoning and variable manipulation. **8.PAR.3.6 – Manipulate linear and literal equations** **Activity: Equation Transformation Stations** • **How it works**: Set up stations with different forms of equations (standard, slope-intercept, point-slope). Students rotate and convert each equation to another form, then solve a related problem. • **Intervention Focus**: Encourages flexibility in working with equations and strengthens problem-solving.
Enrichment and Extension	**GADOE Enhancements extend grade level math standards to nurture critical and creative thinking. The tasks outlined below are aligned with Unit 1 standards and topics and may integrate other content areas. These tasks align with standard 8.PAR.3 and with expectation 8.PAR.3.5.** • **Solving Equations to Represent a Business Plan:** Students de-contextualize a situation to represent it algebraically and re-contextualize to interpret the solution in context of the problem. They write and solve equations to represent a real-world business plan. Access the lesson plan and student activity page: Click here. **Thinking routines provided by Harvard's Project Zero may be incorporated across standards and content areas. Those listed below have been identified for their potential in providing greater depth. Guides detailing each routine can be accessed in full by clicking the provided link.** • **Name, Describe, Act:** This routine can be used to enhance close looking, develop descriptive language, and develop working memory. Depending on the stimulus/context, it can also be used to facilitate analysis of a topic. • **Portable Surprise:** This is a routine for finding (often surprising) patterns in a topic and similar patterns in very different situations.

- 3-2-1 Bridge: This routine helps students understand their own process of learning by considering their conceptions of a topic before and after a learning experience and how their conceptions changed.
- Connect, Extend, Challenge: This routine helps students connect new ideas to those they know and encourages them to reflect upon how they have extended their thinking as a result of what they are learning about or experiencing.
- Take Note: This routine can be used to enhance students' memory of and engagement with ideas by focusing on capturing the heart and distilling key issues and questions after a learning episode rather than in the midst of it. This allows them to participate fully knowing that there are times to consolidate their learning afterwards.
- The Complexity Scale: This routine helps students build a more multi-dimensional mental model of a topic by identifying different aspects of the topic and considering their complexity. The benefit of the routine consists mainly in the reasoning students do in order to choose and explain their ratings. Of less importance is assigning each idea to the "right" place on the scale.

8.PAR.3.1 – Interpret expressions and parts of an expression
Activity: Expression Design Challenge

- **Task**: Students create their own complex expressions to model a real-world scenario (e.g., cost of running a business, area of a composite shape). They must explain the meaning of each term and factor.
- **Extension**: Have students swap expressions and interpret each other's work.

8.PAR.3.2 – Solve equations with one, infinite, or no solutions
Activity: Equation Creator & Analyzer

- **Task**: Students write three equations—one with one solution, one with no solution, and one with infinite solutions. Then, they explain how they know and justify each transformation step.
- **Extension**: Challenge them to create equations that look similar but have different solution types.

8.PAR.3.3 – Create and solve real-life equations/inequalities
Activity: Real-World Math Project

- **Task**: Students choose a real-world topic (e.g., budgeting, sports stats, travel planning) and create a mini-project involving at least two equations or inequalities. They must solve and interpret the results.
- **Extension**: Present findings to the class or create a digital infographic.

8.PAR.3.4 – Justify steps using properties

	Activity: Algebraic Proof Writing • **Task**: Students are given a solved equation and must write a formal justification for each step using algebraic properties. • **Extension**: Introduce error analysis—give them a solution with a mistake and ask them to find and correct it, justifying why it's wrong. **8.PAR.3.5 – Solve equations with letter coefficients** **Activity: Literal Equation Escape Room** • **Task**: Create a series of literal equations that students must solve to unlock clues in a digital or physical escape room format. • **Extension**: Have students create their own escape room puzzles for peers to solve. **8.PAR.3.6 – Manipulate linear and literal equations** **Activity: Equation Transformation Tournament** • **Task**: Students compete in pairs to transform equations into different forms (e.g., slope-intercept, standard, point-slope) and solve related problems. • **Extension**: Include real-world constraints or multi-step problems that require strategic manipulation.
Students with Disabilities	*Specialized instruction in mathematics will be aligned to the student's unique learning needs and designed to support meaningful access to grade-level standards, with teachers using the student's learning profile documents to guide instructional planning*. SI Data Documents Math.docx **Planning for Students with Disabilities** https://lor2.gadoe.org/gadoe/file/efd9a621-abac-42ca-970a-b6edb9966429/1/Thinking-Through-a-Learning-Plan-Protocol.pdf **Georgia DOE Grade 8 Resource Companion for Students with Disabilities:** Grade-8-Mathematics-Resource-Companion-for-Students-with-Disabilities **Strategies Toolkit to Address Learner Variability:** Mathematics-Strategy-Toolkits-Teacher-Toolkit **Specially Designed Instruction:**

	UPDATED-Specially-Designed-Instruction-SDI-Mathematics.pdf **Making Sense of Standard Computational Algorithms** **https://lor2.gadoe.org/gadoe/file/08554c4d-8b44-4425-b1a9-3c384bb6e7dd/1/Making-Sense-of-Standard-Computational-Algorithms.pdf** The purpose of this document is to enhance the understanding of standard algorithms and student-centered approaches to mathematical computation and problem-solving. **Engage** *Within this section, the learning experiences include evidence-based instructional strategies that can be used as an introduction that mentally engages students to capture their interest, provides an opportunity to communicate what they know, and allows them to connect what they know to new ideas.* • Example: Notice and Wonder using visuals. Begin by selecting a routine that aligns with your learning goal—whether that is illustrating fraction models, exploring algebraic graphs, or constructing geometric proofs. Model each step explicitly by thinking aloud; for instance, display a graph and say, "I notice these points form a line, and I wonder if they lie on y = 2x + 1," then show students how to record observations and questions. Provide sentence stems (e.g., "I see…," "I'm wondering if…") and graphic organizers—like a two-column "Notice/Wonder" chart—to guide student responses. • Use images of real-life situations involving linear relationships (e.g., budgeting, travel distances) and ask students what they notice and wonder Notice and Wonder Graphic Organizer 3-8.pdf Notice and Wonder Organizer with Sentence Frames and Lines.pdf **Explore** *Within this section, the learning experiences include evidence-based instructional strategies that allow students to engage in hands-on activities to explore the new concept/big idea at a deep level.* • Demonstrate concepts or procedures in a logical, mathematical progression using "think alouds"— the teacher verbalizing his or her thought process while demonstrating the concept or procedure. Encourage the student to verbalize the strategy they are using to solve the problem and reasons for doing so together. ***Think Aloud Checklist:*** Think-Aloud-Checklist.pdf

	Provide hands-on learning experiences using manipulatives such as algebra tiles, bar models, and graphic organizers. Use "think alouds" to model problem-solving strategies and encourage students to verbalize their reasoning. **Example:** • Demonstrate solving equations using algebra tiles while narrating each step. • Encourage students to explain their own steps using sentence starters. **Apply** *Within this section, the learning experiences include evidence-based instructional strategies that allow students to apply what they have learned in a new situation to develop a deeper understanding of the big idea.* • Encourage the student to verbalize the strategy they are using to solve the problem and reasons for doing so • Teach students chunking strategies *Encourage students to apply learned concepts in new contexts using structured supports. Scaffold tasks by breaking them into manageable steps and gradually increasing complexity.* **Strategies:** • Use chunking techniques to simplify multi-step problems. • Provide graphic organizers to help students organize their work. • Offer sentence frames to support mathematical explanations. **Reflect** *Within this section, the learning experiences include evidence-based instructional strategies that allow students the opportunity to review and reflect on their own learning and new understandings.* What does success and mastery of the concept look like? Determine the impact of strategic, data driven instruction. Is the student benefiting from the specially designed instruction as evidenced by progress towards the IEP goals? Consider how the data informs next steps in instruction. *Provide opportunities for students to review and reflect on their learning. Use formative assessments and student reflections to monitor progress toward IEP goals.* **Guiding Questions:** • What did I learn today? • What strategy worked best for me?

- What can I do differently next time?

Example:

- Students complete a reflection sheet after solving a problem, explaining their process and identifying areas for improvement.

General Strategies to Support Students with Disabilities:

- Use of tactile and concrete objects to support abstract reasoning.
- Teach one step at a time – gradually combine steps (provide checklists)
- Background knowledge connections
- Explicit vocabulary Instruction using visual supports and word routines.
  Vocabulary Word Routine Math.docx

Technology Supports:

- Microsoft OneNote: Use digital notebooks to organize notes, embed visuals, and create interactive graphic organizers. Students can use drawing tools, audio recording, and typing to express their thinking in multiple modalities. OneNote also supports collaboration and teacher feedback.
- Microsoft Word: Provide templates with embedded scaffolds such as sentence starters, checklists, and graphic organizers. Use Word's accessibility features like Immersive Reader, Dictate, and Read Aloud to support students with reading and writing challenges.
- Microsoft PowerPoint: Create visual anchor charts, step-by-step math procedures, and interactive presentations. Students can use PowerPoint to demonstrate their understanding through visuals, animations, and oral explanations.
- Microsoft Teams: Facilitate small group instruction, provide real-time feedback, and support asynchronous learning. Use channels to organize resources, assignments, and discussions tailored to individual learning needs.
- Microsoft Forms: Use quick formative assessments, exit tickets, and student reflections. Forms can be customized to include visuals, branching logic, and accessibility features to support diverse learners.
- Microsoft Excel: Support data analysis and graphing activities. Use Excel to model equations, create tables, and visualize linear relationships. Students can manipulate variables and explore patterns using formulas and charts.

Moving the Needle – 8.PAR.3

Standard
8.PAR.3 Create and interpret expressions within relevant situations. Create, interpret, and solve linear inequalities in one variable to model and explain real phenomena. Professional Learning Video by the GaDOE

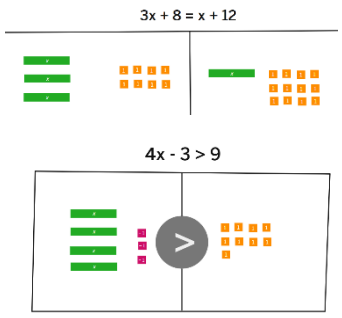
Achievement Level Descriptors

Students who score PROFICIENT (level 3) on EOG can…
• Interpret terms, factors, operations, and coefficients of an expression in context in multi-term expressions by using formulas. • Describe situations with one solution (x = a), infinitely many solutions (a = a), or no solutions (a = b) when solving a one-variable equation. • Create and solve a linear equation or inequality in one variable that models a relevant application. • Solve linear equations and inequalities, including compound inequalities, in one variable from relevant mathematical phenomena with coefficients represented by letters and describe the solution in the context of the problem. • Rearrange formulas and different linear and literal mathematical equations to highlight a quantity of interest and be able to use the new formula to solve for an appropriate value.

Key Vocabulary

• Algebraic properties • Coefficients • Equation	• Equivalent equation • Expression • Factors	• Inverse operations • Linear equation in one variable • Linear inequality in one variable	• Literal equation • Terms • Variable

Key Concepts and Skills

Key Concept/Skill	Recommended Strategies and Supports
Algebraic expressions and formulas	• KWL or Frayer model for vocabulary: terms, factors, coefficients, and operations. • Use common formulas to solve for other variables. • Help students track steps and understand which parts of the equation are being manipulated by using color pencils or highlighters.
Solve one-variable equations and inequalities	• Use Algebra tiles and Algebra mat or use Polypad or Didax to solve visually. Have students write down the steps out as they use the tiles. • Students are building from 6th and 7th grade. This progression will include variables on both sides and compound inequalities. • Testing solutions to see if they are "true" or work, should be done to ensure the problems were set up correctly. Does the answer make sense? 
Algebraic properties to solve equations and inequalities	• Set up a table or a structure to help organize the steps and reasoning of solving equations/inequalities.

8.PAR.3 CCC Support

Vertical Alignment

7th Grade	Algebra
7.PAR.3.1 Construct algebraic equations to solve practical problems leading to equations of the form px + q = r and p(x + q) = r, where *p*, *q*, and *r* are specific rational numbers. Interpret the solution based on the situation. **7.PAR.3.2** Construct algebraic inequalities to solve problems, leading to inequalities of the form px + q > r, px + q < r, px + q ≤ r, or px + q ≥ r, where *p, q*, and *r* are specific rational numbers. Graph and interpret the solution based on the realistic situation that the inequalities represent.	**A.PAR.6.3** Create and solve quadratic equations in one variable and explain the solution in the framework of applicable phenomena. **A.PAR.8.2** Create exponential equations in one variable and use them to solve problems, including mathematically applicable situations.

CCC Question 1: What is it we expect students to learn?

When reviewing expectations, it's important to consider the priority standard, learning objectives, evidence of student learning, and supporting teacher resources to get a full picture of what we want our students to learn. Click HERE to access the full document. Formula Sheet 8th Grade Math. *Georgia Testing Desmos Calculators:* Four Function, Scientific, and Graphing.

CCC Question 2: How will we know when they have learned it?

Unit Assessments are in Unit Resources in CTLS. (1.01 – 1.05 PDF versions)

From the GaDOE Online Assessment Guide question 1.
Sandra makes necklaces and sells them at a school craft fair. She uses the equation P = 7.5n – (2.25n + 15) to determine her total profit, in dollars, at the fair when n necklaces are sold. Based on this equation, how much does she charge for each necklace?

A. $2.25 B. $7.50 C. $15.00 D. $17.25

Evidence of Student Success can be found in each State Learning Plan. Example: Compound Inequalities

Formative Assessment Questions:

Amy's teacher is preparing them for their test on inequalities. Her teacher places students into two groups based on their quiz scores. Students scoring an average of 75 or less will be in the remediation group and the students scoring 85 and above will be given work to extend their learning. The scores that she made on her previous quizzes were 75, 82,87, and 85. Amy must take one more quiz. What quiz score would she need to make to be put in one of these two groups? Write and solve a compound inequality that describes this situation. Graph the solution and describe the solution in the context of the problem.

CCC Question 3: How will we respond when they don't learn?

Multiple representations and visual mathematics: small group instruction using algebra tiles, equations mats, and inequality mats.
Source: Hands-on Standards 8th Grade, pages 36-41 and Hands-On Standards Algebra, pages 14-15.
Intervention Tasks provided by GaDOE *page 25*

Standard	Learning Objectives	Name of Intervention Task/Activity	Skills Addressed
8.PAR.3	*8.PAR.3.1* *8.PAR.3.3*	*Balancing Act* *Choices* *Food for Thought Using Equations*	Form and solve simple linear equations. Interpret expressions

CCC Question 4: How will we respond when they already know it?

- *Interdisciplinary Connections, Unit 1 "Got Density? The Chocolate Bar Redesign"*
  Overview: Students will incorporate patterning and algebraic reasoning to create, interpret, solve, and graph linear equations and inequalities in one variable. The equations and inequalities include those with rational coefficients, variables on both sides and whose solutions require the use of the distributive property and combining of like terms. Students will interpret expressions with multiple factors and/or terms and manipulate linear and literal equations expressed in various forms.
- *GaDOE's Assessment Item Bank, Unit 1, Items 1, 2, & 8, DOK 3*

Algebra Readiness Connection

This standard is significant as it involves creating, interpreting, and solving expressions and linear inequalities in one variable. This skill is fundamental for algebra because it helps students understand how to represent and analyze real-world situations mathematically. By working with expressions and inequalities, students learn to model real phenomena, which is a key aspect of algebraic thinking. This standard ensures that students can translate real-life problems into mathematical terms, solve them, and interpret the results, thereby building a strong foundation for more advanced algebraic concepts and applications.

ONE TEAM.ONE GOAL.STUDENT SUCCESS.

MATHEMATICS

STRATEGIC COMPETENCE: BALANCING THE HOW, WHY, AND WHEN.

8th Grade Math Milestone Minute

8.PAR.3: Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena.

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• Identify terms, factors, and coefficients in an expression. • Solve linear equations in the form of $ax + b = cx$ with one solution.	• Interpret terms, factors, operations, and coefficients of an expression in context in binomial expressions. • Solve linear equations in one variable that have infinitely many solutions or no solutions, and identify the linear equation or inequality in one variable that models a relevant application. • Use relevant algebraic properties to solve one-variable equations or inequalities. • Justify the steps of a one-solution equation or inequality. • Solve linear equations and inequalities in one variable with coefficients represented by letters (e.g., $ax + 3 = 7$, solve for x).	• Interpret terms, factors, operations, and coefficients of an expression in context in multi-term expressions by using formulas. • Describe situations with one solution ($x = a$), infinitely many solutions ($a = a$), or no solutions ($a = b$) when solving a one-variable equation. • Create and solve a linear equation or inequality in one variable that models a relevant application. • Solve linear equations and inequalities, including compound inequalities, in one variable from relevant mathematical phenomena with coefficients represented by letters and describe the solution in the context of the problem. • Rearrange formulas and different linear and literal mathematical equations to highlight a quantity of interest and be able to use the new formula to solve for an appropriate value.	• Explain real-world phenomena involving linear equations and inequalities, including compound inequalities in one variable, and relate solutions or solution sets back to the contexts of the real phenomena.

Question 1

Sandra makes necklaces and sells them at a school craft fair. She uses the equation $P = 7.5n - (2.25n + 15)$ to determine her total profit, in dollars, at the fair when n necklaces are sold.

Based on this equation, how much does she charge for each necklace?

A. $2.25

B. $7.50

C. $15.00

D. $17.25

MATHEMATICS

Question 1 Answer

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