Grade 8 Unit 4: Linear Equations and Linear Systems
Lessons 1-9: Linear Equations in One Variable

Explore, Play, and Discuss

- I can add or remove blocks from a hanger and keep the hanger balanced.
- I can represent balanced hangers with equations.

Activity Suggestions:
- ➢ Activity 1 from the Grade 8 Unit 4 Family Materials: Use the overview to build understanding and then try the sample activity before checking the solution.
- ➢ Lesson 2: Students respond to questions in an online or paper journal, or talk them over with someone at home.
- ➢ Activity 3.2 Virtual Card Sort
- ➢ Lesson 3, Practice problems 1: Encourage students to draw the hanger with the substituted values to confirm the hanger is balanced.
- ➢ Activity 7.1: Ask family to discuss which one they think does not belong.
- ➢ Activity 7.2, Part 1 Only: Sort the cards. Check your reasoning by substituting in values for the variables.

Assessment Suggestions:
- ➢ Check Your Readiness assessment: Administer all 5 items within the first day or two of this section. Use the guidance provided with each problem to adjust instruction so that students can access the math in the unit.

Deep Dive

- I can add, subtract, multiply, or divide each side of an equation by the same expression to get a new equation with the same solution.
- I can make sense of multiple ways to solve an equation.
- Create linear equations in one variable that have either no solutions or infinitely many solutions, using structure, and explain (orally) the solution method.
- Describe a linear equation as having "one solution", "no solutions", or "an infinite number of solutions", and solve equations in one variable with one solution.

Activity Suggestions:
- ➢ Activity 3.3: Sync discussion. Focus on making the different moves visible as discussed and encouraging students to do the same through writing or speaking.
- ➢ Lesson 4: Sync discussion

Assessment Suggestions:
- ➢ Lesson 3 cool-down or Activity 5.1
- ➢ Lesson 4 cool-down
- ➢ Lesson 7 practice problems 1–3

	➢ If time permits, explore these activities: 　○ Activity 7.2, Parts 2 and 3 Only: Have a synchronous discussion about parts 2 and 3. 　○ Activity 7.3: Have a synchronous discussion about Activity 3. To the extent possible, ensure that every student gets to communicate a generalization for part 3.	

Synthesize and Apply	● I can solve an equation where the variable appears on both sides. ● I can solve linear equations in one variable. ● Describe features of linear equations with one solution, no solution, or an infinite number of solutions.	
	Activity Suggestions: ➢ Activity 5.2: Make contents of cards available in online or paper journals for students to respond. ➢ Lesson 6: Students respond to questions in an online or paper journal, or talk them over with someone at home. ➢ Teach and encourage students to study the lesson summaries (at the end of every lesson) and refer back to them. ➢ Activity 9.1 ➢ Activity 9.2	**Assessment Suggestions:** ➢ Lesson 6 cool-down ➢ Revisions to previous assessment prompts ➢ Students use learning targets to decide what additional practice they need. ➢ Create examples of equations with one, zero, or infinite solutions. This can be tiered so that students may write equations that require no manipulation or as more complex equations that require multiple operations.

Ongoing Practice	● Assign one or more of the distributed practice problem sets from Lessons 1–6 to be completed over the time period that the section is being worked on. ● These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit. ● Specify which problems students should submit, or let them choose.

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<td>Anytime Resources</td>
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- Delve into one of the culminating lessons from units 1, 2, or 3.
- These lessons show prior grade level lessons featuring hanger diagrams:
  - Grade 6 Unit 6 Lesson 3
  - Grade 7 Unit 6 Lesson 7
  - Grade 7 Unit 6 Lesson 8

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Lessons 10–16: Systems of Linear Equations

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- Create an equation in one variable to represent a situation in which two conditions are equal.
- Interpret the solution of an equation in one variable in context.

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Activity Suggestions:
➢ Activity 10.1: Ask family to discuss which one they think does not belong.
➢ Activity 10.2: Focus on the meaning of points that lie on the line.
➢ Activity 10.3: Focus on the meaning of point of intersection.
➢ Activity 11.1 and 11.2: These should be considered one assignment because they build off each other.
➢ Activity 2 from the Grade 8 Unit 4 family materials: Use the overview to build understanding and then try the sample activity before checking the solution.

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Assessment Suggestions:
➢ Lesson 10 cool-down

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Deep Dive

- Determine a point that satisfies two relationships simultaneously, using tables or graphs.
- Interpret points that lie on one, both, or neither line on a graph of two simultaneous equations in context.
- Create a graph that represents two linear relationships in context, and interpret the point of intersection.
- Interpret a graph of two equivalent lines in context.

Activity Suggestions:

➢ Activity 12.2: This activity formally introduces the idea of systems of equations.
➢ Activity 12.3: This activity is the first example of a system of equations with no solutions. Given how full this section is, it may not be possible to have students engage with this task then discuss it. The graphs and equations representing the heights of the stacked cups can be presented and the discussion can focus on what the solution (or lack of solution) means in this context.

Assessment Suggestions:

➢ Lesson 11 cool-down
➢ Lesson 12 practice problems

Synthesize and Apply

- Comprehend that solving a system of equations means finding values of the variables that makes both equations true at the same time.
- Coordinate graphs of parallel lines and a system of equations that has no solutions.
- Create a graph of two lines that represents a system of equations in context.

Activity Suggestions:
➢ Activity 14.1
➢ Activity 14.2
➢ Activity 15.1
➢ Activity 15.2
➢ Teach and encourage students to study the lesson summaries (at the end of every lesson) and refer back to them.

Assessment Suggestions:
➢ Create a context that results in a system of equations with one solution or no solutions.
➢ Revisions to previous assessment prompts
➢ Students use learning targets to decide what additional practice they need.

Ongoing Practice	- Assign one or more of the distributed practice problem sets from Lessons 1–6 to be completed over the time period that the section is being worked on. - These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit. - Specify which problems students should submit, or let them choose.

Anytime Resources	- Delve into one of the culminating lessons from units 1, 2, or 3. - Grade 8 Unit 3 Lesson 12 focuses on interpreting the meaning of solutions within linear equations in the form: $Ax + By = C$. - Grade Unit 4 Lesson 16 - Look for a graphical representation of a system of equations (linear or non-linear) in the news and write about the meaning of the point of intersection.