

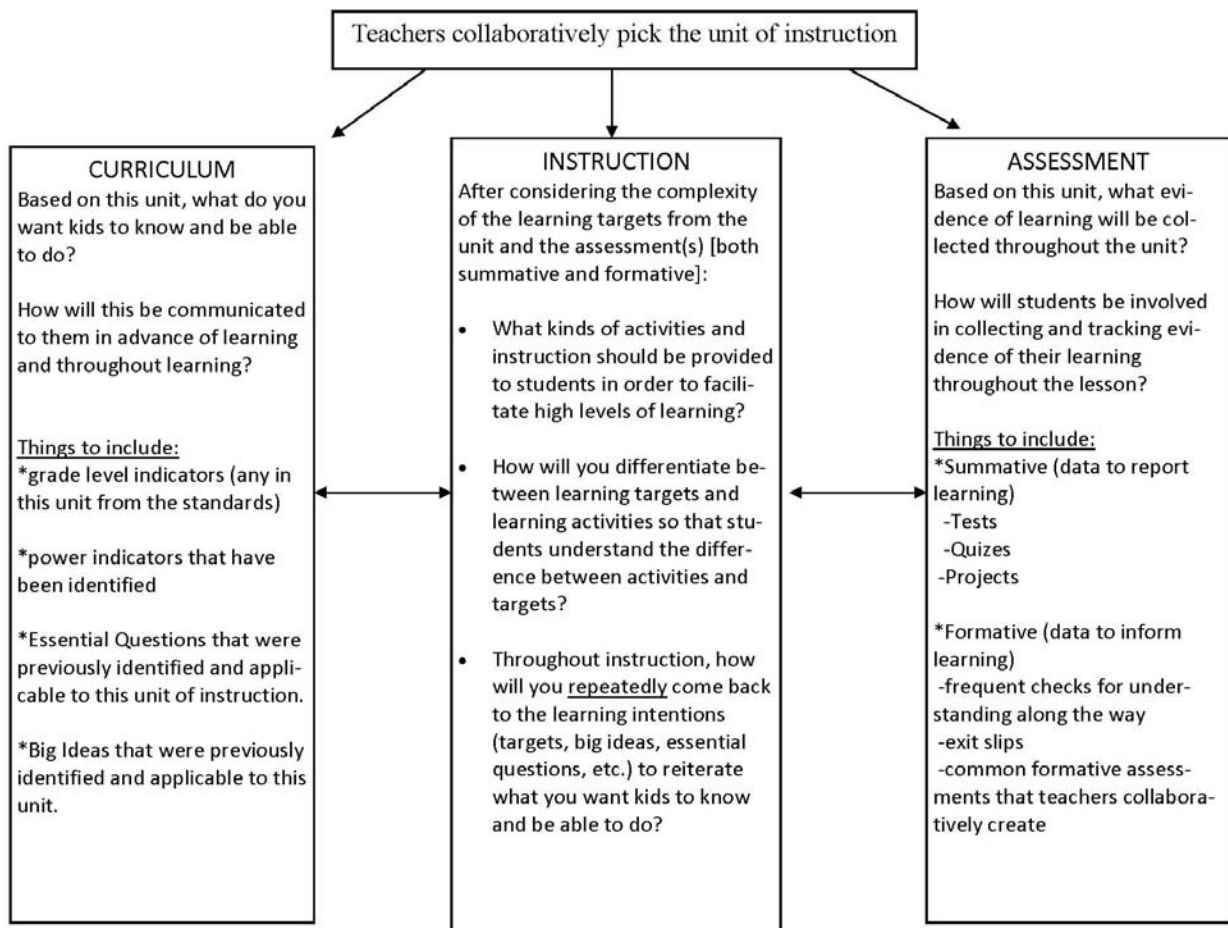
# Olmsted Falls Schools: Unit Design Framework

The purpose of the lesson planning framework is to act as a guide for Olmsted Falls Educators as they collaboratively plan units of instruction. The framework attempts to incorporate best practices from the research and couple these with the professional development concepts that Olmsted Falls Educators have taken part in.

Academic content standards and the learning targets that comprise the standards come to life for teachers and students when they are incorporated into a unit of instruction. Teachers work in teams to ensure the learning intentions are the same in corresponding grade levels and subject areas. Teaching the same targets creates the opportunity to collaboratively design common formative assessments that can be collaboratively discussed throughout the instructional unit with fellow teachers. In addition, it allows teachers to design reliable and valid summative assessments that can be used to measure learning at the end of the instructional unit and use the results for future planning.

Ultimately the unit design framework should be used by teachers for the purpose of instructional alignment. The learning targets should be clear to students before and during instruction and they should be aligned with the assessments students will experience. The last step in the alignment process occurs when the learning targets and assessments are consciously aligned with the instruction and classroom activities.

Unit Planning Graphic Linking Prof. Dev. Concepts in Olmsted Falls City Schools



Graphic created by Jim Lloyd and used by Olmsted Falls City Schools' Teachers

**Subject:** Math – Grade 8      **Unit:** Solving Linear Equations and Inequalities (Ch. 2, 3, and 10)

## Part I: Clarity of Learning Targets

**What are the grade level indicators that go with this unit? Place a star next to the grade level indicators that are Power Indicators. Are the indicators in student friendly language? Place the level of Bloom's Taxonomy next to each Power Indicator.**

### **Patterns, Functions, and Algebra**

7. Use symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems. (Power) (Apply)

**Student Friendly (Power): I can write and solve an equation or inequality to represent a real life situation.**

8. Write, simplify and evaluate algebraic expressions (including formulas) to generalize situations and solve problems. (Analyze)

**Student Friendly: I can simplify and find the value of an algebraic expression.**

9. Solve linear equations and inequalities graphically, symbolically and using technology. (Apply)

**Student Friendly: I can find the value(s) of the variable that make an equation or inequality true.**

### **Number, Number Sense, and Operations**

4. Explain and use the inverse and identity properties and use inverse relationships (addition/subtraction, multiplication/division, squaring/square roots) in problem solving situations. (Power) (Apply)

**Student Friendly (Power): I can explain how to use the inverse relationships to solve equations or inequalities.**

5. Determine when an estimate is sufficient and when an exact answer is needed in problem situations, and evaluate estimates in relation to actual answers; e.g., very close, less than, greater than. (Evaluate)

**Student Friendly: I can interpret the solution to my equation as it applies to a real life situation.**

*\*See Instruction and Student Activities section for learning targets broken down into manageable chunks.*

## **What are the Big Ideas that go with this unit?**

- Linear equations and inequalities can be used to solve a variety of real life problem situations involving constant rate.
- Inverse operations are used to isolate the variable and solve algebraic equations and inequalities.
- There can be multiple solutions to an equation or inequality, which can be represented symbolically or graphically.

## **What are the Essential Questions that go with this unit?**

- How can we use linear equations and inequalities to solve real life problems?
- How do you use inverse operations to solve linear equations and inequalities?
- When an equation or inequality has multiple solutions, how do you represent them?

## **What strategies will we use in order to make learning targets clearer for all students, before, during and after instruction? How will you communicate the learning indicators to students?**

- Teacher communicates and displays the learning targets and essential questions
- Check with the students for understanding of the learning targets and essential questions (review the learning target/big idea at the end of the class period)
- Connect class assignments and activities to the learning targets
- Use examples of student work – strong/weak

**Part II: Feedback and Assessments (Formative and Summative)**

**How will we provide students with feedback throughout the unit?**

**What formative assessments will we use? (Non-graded assignments that check for understanding and provide feedback to the students) Incorporate the 7 Strategies of Assessment for Learning here.**

- Solving Equations and Inequalities Self-Assessment: The students will complete practice problems aligned with the learning targets. The students will use the practice problems as evidence to rate themselves – I know this, I am not quite sure yet, or I still need a lot of help. The students will rate themselves several times throughout the unit.
- The self-assessment will also be used as an exit slip – The teacher will collect the practice problems/self assessment at the end of the class period and will plan instruction or small group reviews the next day accordingly.

**How will students be involved with keeping track of their own learning progress (note—this is different than tracking points for a grade)?**

- The students rate themselves regularly throughout the unit according to their level of understanding for a particular learning target. The teacher conducts small group reviews based on the results.

**What summative assessments will we use? (Graded, evaluative assessments)**

- Quiz #1
- Quiz #2
- Unit Test
- Problem Solving Activity

**Part III: Instruction and Student Activities**

**What instructional and student activities will we use for this unit? These activities should directly align with the indicators and assessments.**

- A) I can use inverse operations to solve one-step equations that include integers.
- Lesson 2-4 pg. 76 – 1 step equations, integers all operations #1-26
- B) I can use inverse operations to solve one-step equations that include rational numbers.
- Lesson 3-6 pg. 138 – 1 step equations, rational numbers all operations #1-13, pg. 76 #27-34
- C) I can use inverse operations to solve one-step inequalities and graph the solutions.
- Lesson 2-5 pg. 80– 1 step inequalities, solve and graph #1-12, pg. 76 #35-37, pg. 138 #14-16
- D) I can use inverse operations to solve two-step equations.
- PA Pizzazz – pg. 207, 2 step equations with integers
  - PA Pizzazz – pg. 208, 2 step equations with rational numbers
  - PA Pizzazz – pg. 209, 2 step equations with rational numbers
  - Lesson 10-1 pg. 500 – 2 step equations with rational numbers – Assign #1-14

**Summative Assessment Quiz #1 (Learning Targets A-D) (No Calculator Part)**

- E) I can write and solve a 2-step equation to represent a real-life situation.
- Rental problem part one
  - Two step real life situations (see handout)
- F) I can use inverse operations to solve two-step inequalities.
- Worksheet pg. 88 Solve and graph (Book C) – odds in class, evens for homework
  - PA Pizzazz worksheet 224
- G) I can solve a multi step equation by simplifying first.
- Book A pg. 71 and 73 (Begin using a calculator at this point)
- H) I can use inverse operations to solve multi-step inequalities.
- Book A pg. 72-74 (Change to  $<$ ,  $>$ )

**Summative Assessment Quiz #2 (Learning Targets E-G)**

- I) I can solve equations with variables on both sides.
- Book A pg. 75 #1-18
  - Algebra Practice A Worksheet 3.4 – special case – no solution or infinite solutions

J) I can solve inequalities with variables on both sides and graph the solutions.

- Pg. 192 Algebra Pizzazz Worksheet

K) I can write and solve an equation or inequality with variable on both sides to represent a real life situation.

- Rental part two
- Real life problems – write and solve equations/inequalities with variables on both sides

**Summative Assessment #3 – Unit Test (Learning Targets - All)**



Key:     I am sure I know this          I am not quite sure yet          I still need a lot of help.  
Record the date each time you assess yourself.

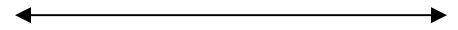
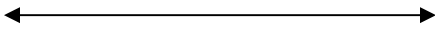
**E. I can solve and graph the solutions to a 1-step and 2-step inequality. (2.5/10.4)**

\_\_\_\_\_

Date:

Example: Solve 8.)  $-3 + x < 21$

9.)  $-5x - 9 \geq -4$



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**F. I can solve a multi-step equation by simplifying first. (10.2)**

\_\_\_\_\_

Date:

Example: Solve 10.)  $-70 = -3g - 7 + 12g$

11.)  $4(x - 2) = 16$

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**G. I can use inverse operations to solve a multi-step inequality. (10.4)**

\_\_\_\_\_

Date:

Example: Solve: 12.)  $3x - 2 - 4x > 5$

13.)  $-3x + 4 \leq 13$



## Solving Equations & Inequalities Self Assessment

NAME \_\_\_\_\_

**Key:**     I am sure I know this          I am not quite sure yet          I still need a lot of help.  
Record the date each time you assess yourself.

### H. I can solve equations with variables on both sides. (10.3)

\_\_\_\_\_

Date:

Examples: Solve

14.)  $8x + 24 = 3x + 59$

15.)  $-2a - 4a + 9 = -3a - 15$

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### I. I can use inverse operations to solve inequalities with variables on both sides (10.4)

\_\_\_\_\_

Date:

Examples: Solve .

16.)  $2x + 3 > 5x - 6$

17.)  $7 - 2w \leq 2w + 19$

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### J. I can write and solve an equation/inequality with variables on both sides to represent a real-life situation. (10.3-10.4)

\_\_\_\_\_

Date:

Example:

18.) You want to rent a big screen TV to watch the NCAA tournament. Raquel's rental company charges \$12 per day and an additional \$60 for delivery. Kyle's rental company charges \$18 per day and an additional \$30 for delivery. Write an inequality that you could solve to find out how many days will the cost of Raquel's company be cheaper. Solve the inequality to determine how many days rental will Raquel's company be cheaper than Kyle's. Show your work. Write your solution as a sentence.