# Common Core Units of Study
# Algebra 1

Getting to the Core



Tuesday, May 14, 2013
Wednesday, May 15, 2013
Wednesday, May 22, 2013

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# Agenda

- Introduction to Units of Study
- Common Core Math Units
- Algebra 1 Unit Overview
- Summative Assessment
- Questions / Answers
- Reflection



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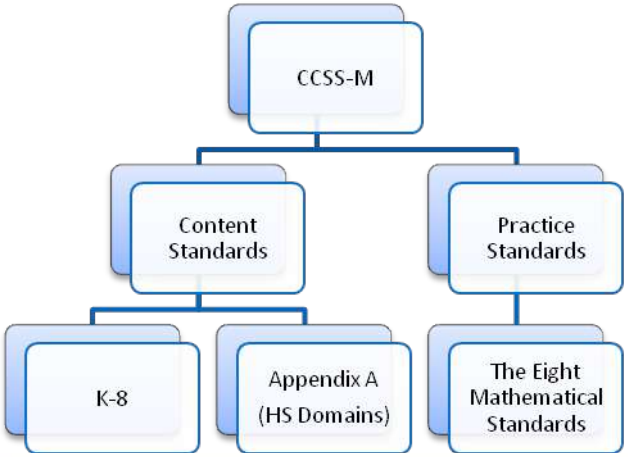


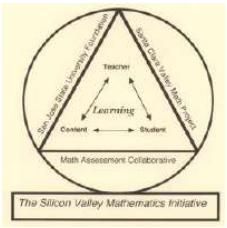


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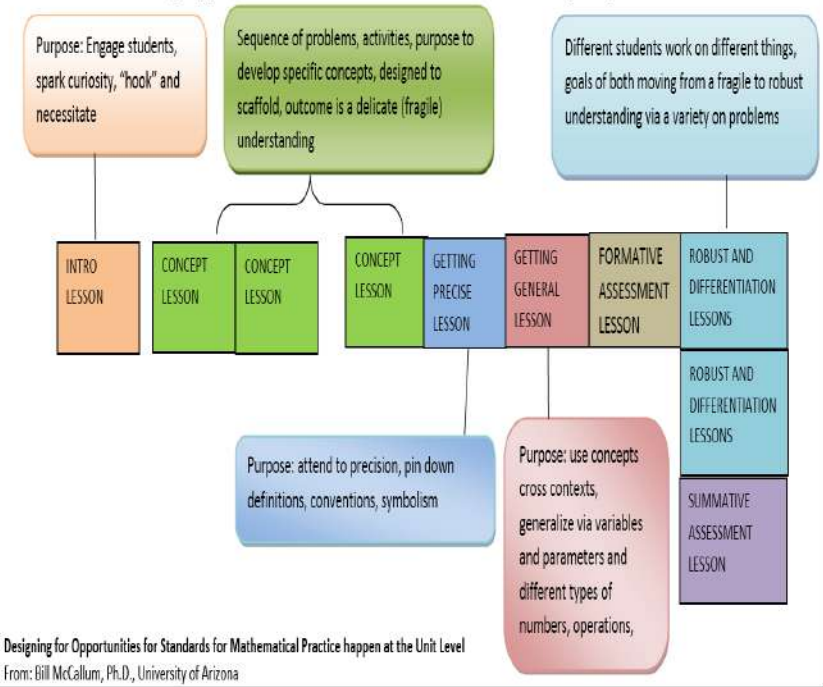
Santa Ana Unified School District Common Core Unit Planner-Mathematics

| | | |
|---|---|---|
| Unit Title: | | |
| Grade Level/Course: | | Time Frame: |
| Big Idea (Enduring Understandings): | | |
| Essential Questions: | | |

**Instructional Activities:** Activities/Tasks

## Units have many types of lessons that have different **purposes**




Designing for Opportunities for Standards for Mathematical Practice happen at the Unit Level
From: Bill McCallum, Ph.D., University of Arizona

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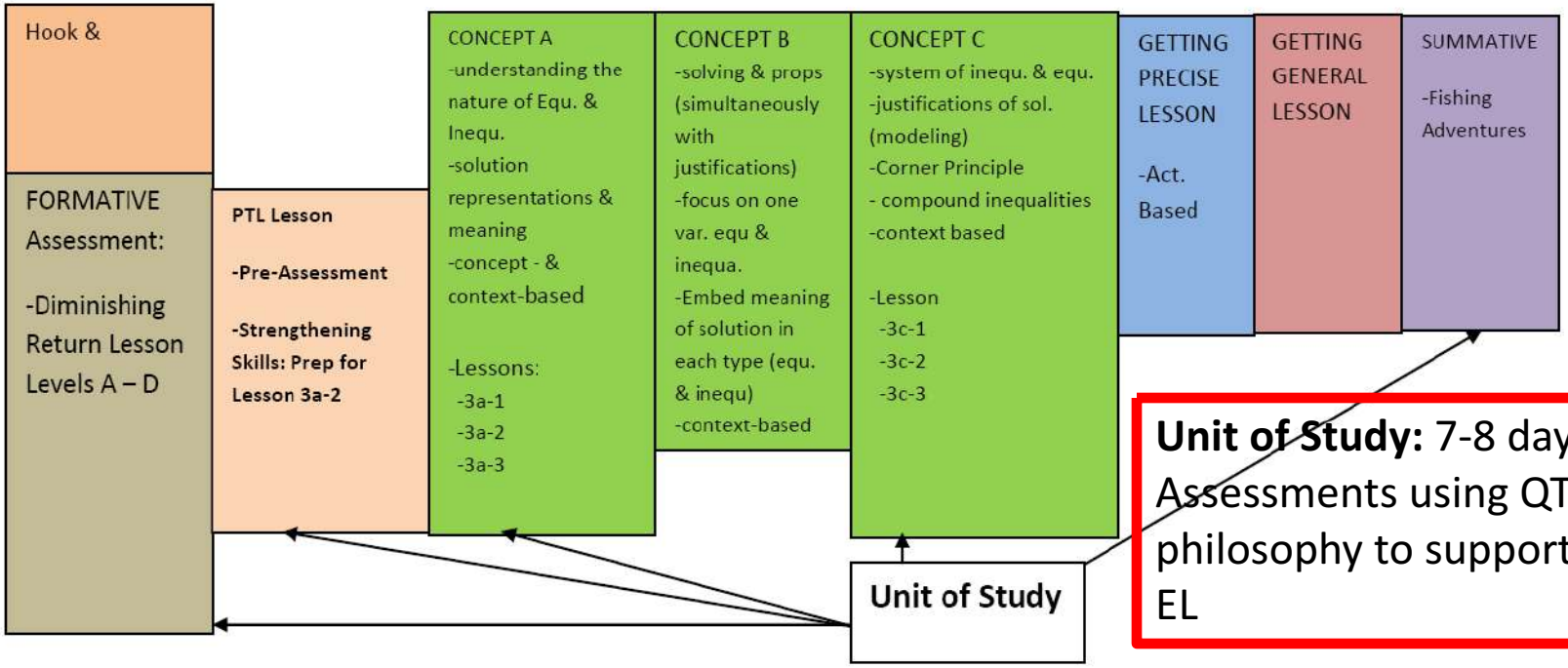
# Santa Ana Unified School District Common Core Unit Planner-Mathematics

| | | |
|---|---|---|
| **Unit Title:** | Equations & Inequalities in One Variable | |
| **Grade Level/Course:** | Algebra I/CC Course 1 | **Time Frame:** 7 – 13 days |
| **Big Idea (Enduring Understandings):** | Algebraic representations are used to communicate and generalize patterns in mathematics. | |
| **Essential Questions:** | How are equations and inequalities useful?<br>How can multiple representations be used to express relationships? | |

**Instructional Activities:** Activities/Tasks

## Units have many types of lessons that have different **purposes**




**Designing for Opportunities for Standards for Mathematical Practice happen at the Unit Level**
Presented by Bill McCallum, Ph.D., Algebra Forum 2012

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## Unit 3 – Equations & Inequalities In One Variable
## Table of Contents




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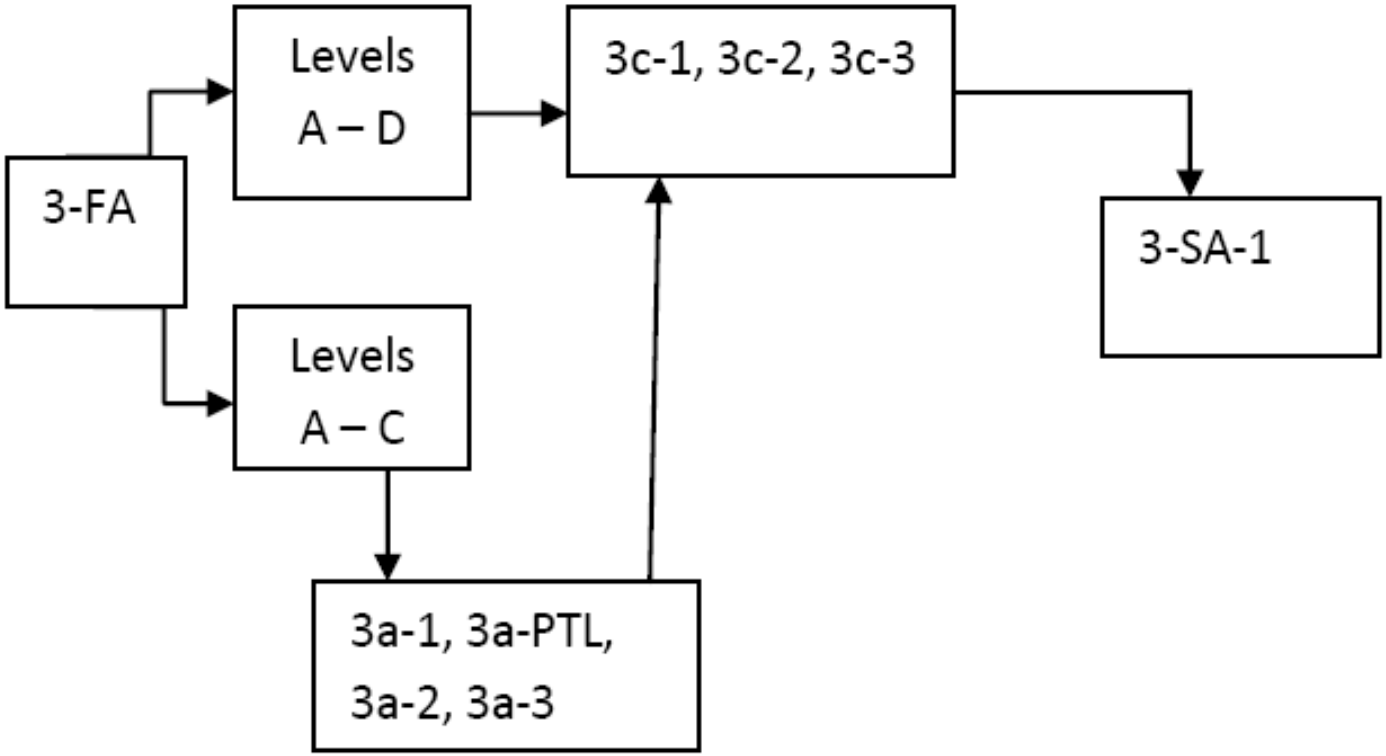
# 3-FA – Formative Assessment: Diminishing Returns

Pgs. 15-18

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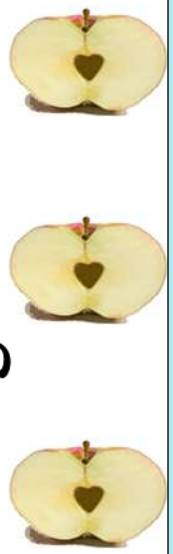
# 3-FA:Summative Assessment

- Diminishing Return
  - Silicon Valley Math Initiative Assessment
  - **Objectives**:
    - Modeling with mathematics with focus in Coherence and Rigor of Expressions and Equations in fluency and application
    - Collaborative Work and communication: Pairs or Groups



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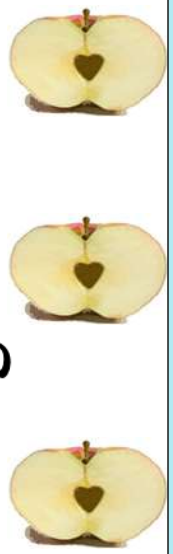
# Diminishing Return: Levels A – D

- You are given 20 minutes to collaboratively work in groups of 4. Your tasks include:
  - Solving as many levels as you can
  - Providing your best solved problem on the poster
  - Be prepared to perform a Gallery Walk afterward



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# Collaborative Work Structure: Dyad Share

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| Agree/Support | Disagree/Contest | Extend/Expound |
|---|---|---|
| • You made a good point when you said …. | • Another way to look at it is …. | • When I read … on page ___, I thought … |
| • I see what you're saying. I agree because …. | • I understand what you said about …, but I think … | • I think the text supports my thinking on …, by stating that … |
| • My idea builds on ____'s idea. I think … | • I have a different answer. I wrote down …. | • Another example of … is … where it mentioned … |
| | | • I have a question about what you said about … |
| | | • Could you give me an example of what you mean by… |

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# Gallery Walk

- Each group will display their poster.
- **Group Structure:**
  - **Student 1:** Docent: answer or provide clarifications / explanations to visitors
  - **Student 2:** What is a unique method that is very different from the rest of the team?
  - **Student 3:** What is the method that is found across the teams?
  - **Student 4:** Pick one method/poster that gives a different answer from yours. Evaluate that method.

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# 3c-1 The Theme Park Ride

1. You and a friend entered a contest and won two tickets to Knott's. Both of you decided that you want to ride on Silver Bullet first.

The **minimum** height requirement is 54 inches and the **maximum** is 84 inches.

Your friend is 62 inches tall. Your height is _____ inches.

Can both of you ride together? _____, because _____

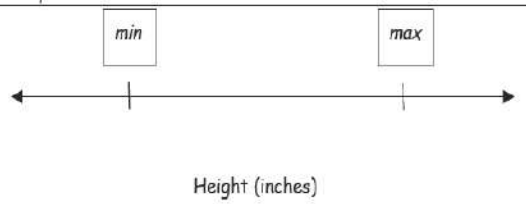
_____

There are many people including little children that want to ride the Silver Bullet. Represent the height restrictions mathematically.

2. For the following guests decide whether or not they meet the height requirements. Represent the information on the given number line. Label each person's first name initial on the number line.

| Guest | Height |
|---|---|
| Juan | 61 in |
| Sarah | 70 in |
| Christi | 55 ½ in |
| Alberto | 3 ft |
| Berry | 54 in |
| David | 73 in |
| Nicole | 65 in |
| Rachel | 42 in |
| Teresa | 5 ft |
| Mark | 7ft 2in |

Visual Representation




List all riders who are eligible to ride:

_____

3. Let $x$ represent the heights of all qualified riders:

What must $x$ be greater than or equal to? $x \geq$ __

AND

What must $x$ be less than or equal to? $x \leq$ __

According to the safety rules, **both** height requirements must be met in order to ride. Create a **compound inequality** to represent the height restriction mathematically.

$$\_\_ \leq x \leq \_\_$$

Why do you think this is called a **compound inequality**?

_____

_____

# Clarifying Bookmark

| What I can do | What I can say |
|---|---|
| I am going to think about what the problem may mean. | *I'm not sure what this is about, but I think it may mean…* |
| | *This part is tricky, but I think it means…* |
| | *After rereading this part, I think it may mean…* |
| | |
| I am going to summarize my understanding so far. | *What I understand about this problem so far is …* |
| | *I can summarize this part by saying…* |
| | *The main points of this section are …* |

- I Spy (Send a Spy)
  - When the team is stuck, one student can go around to another team and listen in
  - Student reports back to the team what was learned

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# 3c-2 Simultaneous Equations & Inequalities

**Definition:** A system is two or more equations or inequalities represented by the brace symbol, $\left\{\right.$

For the next two examples use the formula (equation) that converts Celsius to Fahrenheit to create and solve a system of equations.

1. The boiling point of water is 100°C. Find the boiling point of water in degrees Fahrenheit.

$$\begin{cases} C = \_\_\_ \\ F = -C + \_\_ \end{cases}$$

2. Water freezes at 32°F. Find the freezing temperature in degrees Celsius.

$$\left\{\right.$$

3. Solve the following system of equations

$$\begin{cases} 3x + 2y = 8 \\ x = 7 \end{cases}$$

4. Solve the following system of one inequality and one equation

$$\begin{cases} 3x - 4y \leq 24 \\ y = 3 \end{cases}$$

Looking back to the definition box and examples 1 to 4, redefine systems of equations (inequalities) in your own words.

_____

_____

What is the symbol used to group the equations (inequalities) of a system?

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MP1. Students make conjectures about the form and meaning of the solution.

- How did the Mayor problems help you with methods and strategies to solve these problems?
- What strategies did you use?
- How was it being used?
- How did those problems help you with these problems?
- How did the group conversations help you solve these problems?

- **Triple-Entry Journal**

| Part 1 Main Idea | Part 2 Main Idea | My Understanding |
|---|---|---|
| What I learned from Part 1 was to _____. | What I did from Part 2 was to _____. Then I did _____. | What I understand from this lesson was to _____. |

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# 3c-3 Simple Interest

- Informational Texts
- Text Complexity
- Literacy Skills
- Reading with Purpose
- Close-Read or Three-Read strategies

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# 3c-3 Simple Interest

The following text is from Wikipedia.org about **simple interest**. Read and analyze the text before answering the questions below.

Interest is a fee paid by a borrower of assets to the owner as a form of compensation for the use of the assets. It is most commonly the price paid for the use of borrowed money,[1] or money earned by deposited funds.[2]

When money is borrowed, interest is typically paid to the lender as a percentage of the principal, the amount owed to the lender. The percentage of the principal that is paid as a fee over a certain period of time (typically one month or year) is called the interest rate. A bank deposit will earn interest because the bank is paying for the use of the deposited funds. Assets that are sometimes lent with interest include money, shares, consumer goods through hire purchase, major assets such as aircraft, and even entire factories in finance lease arrangements. The interest is calculated upon the value of the assets in the same manner as upon money.

### Simple interest

Simple interest is calculated only on the principal amount, or on that portion of the principal amount that remains unpaid.

The amount of simple interest is calculated according to the following formula:

$$I_{simp} = r \cdot B_0 \cdot m_t$$

where $r$ is the period interest rate (l/m), $B_0$ the initial balance and $m_t$ the number of time periods elapsed.

To calculate the period interest rate $r$, one divides the interest rate $l$ by the number of periods $m_t$.

1. What does the letter $I$ in the formula represent?
2. What does the letter $r$ in the formula represent?
3. What does the letter $B_0$ in the formula represent?
4. What does the letter $m_t$ in the formula represent?

**Reading with Purpose: Three-Read Strategy**

**First Read:**
- What is the problem about?

**Second Read:**
- What are the quantities in the problem?

**Third Read:**
- What is the question?
- What are the possible questions that might be asked from the given information?
- Can you come up with other questions regarding the problem? List them.

**Dyad Share**

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# Dyad Share Structure

| Agree/Support | Disagree/Contest | Extend/Expound |
|---|---|---|
| • You made a good point when you said …. | • Another way to look at it is …. | • When I read … on page ___, I thought … |
| • I see what you're saying. I agree because …. | • I understand what you said about …, but I think … | • I think the text supports my thinking on …, by stating that … |
| • My idea builds on ____'s idea. I think … | • I have a different answer. I wrote down …. | • Another example of … is … where it mentioned … |
| | | • I have a question about what you said about … |
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**Summative Assessment** **Name** _____


**Direction:** You are to work on this Assessment with a partner.

Fishing Adventures rents small fishing boats to tourists for day long fishing trips. There are two options for boat rentals that you need to consider in order to choose the appropriate boat for your group.

**Option 1: (Adults only)**

Each boat can hold at most 1200 pounds of people and gear for safety reasons. Assume on average an adult weights 150 pounds and are allowed to have 15 pounds of gear each. Also assume each group will require 200 pounds of gear.

Question: How many adults are allowed on the boat? Illustrate your reasoning algebraically and graphically by providing

b. An inequality that represents the weight limit and the total of passengers allowed on the boat
c. A solution set to the inequality on a number line or coordinate plane.

**Option 2: (Family)**

Each boat can hold at most eight people. Additionally, each boat can only carry 1200 pounds of people and gear for safety reasons. Assume on average an adult weighs 150 pounds and a child weighs 75 pounds. Also assume each group will require 200 pounds of gear plus 10 pounds of gear per person.

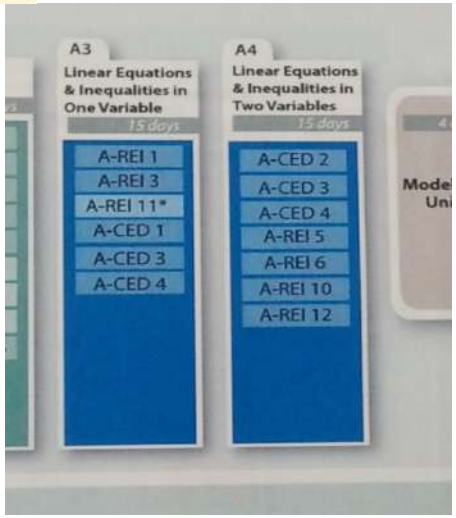
Question: How many adults and children are allowed on this boat in order to optimize the weight limit? Illustrate your reasoning algebraically and graphically by providing

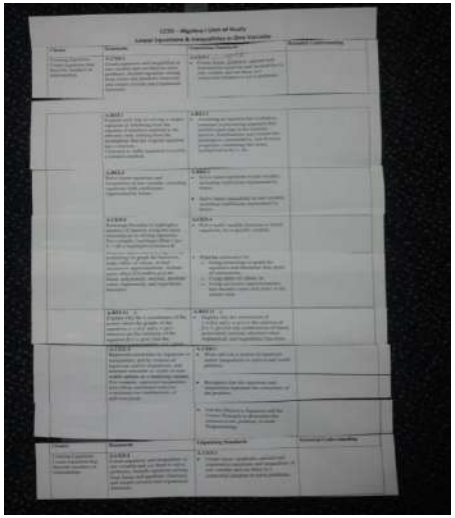
a. An inequality or system of inequalities that represent the weight limit and the total number of passengers allowed on the boat.
b. A solution set to the inequalities on coordinate plane.

**Question:** Compare the two options.

c. How are these two options different or alike mathematically and graphically?
d. How was your approach to one option different from the other? Explain.
e. If you were to pick one option for your family, which option will you go for? Explain.

# Process of Unit Writing



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Draft 1 → Feedback -Chairs -IMP -SVMI → Draft 2 → Feedback -Chairs -Teachers -IMP -SVMI → Final Draft

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# Reflection

- What excites you about this unit?
- What challenges might you expect?
- What support will you need?



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# Electronic Copy of Units of Study

- Visit District website/Staff Portal/ Curriculum/ Mathematics Grades 6 – 12 / Units of Study /
  - Math 6
  - Algebra I
  - Geometry
  - Algebra II

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# Thank you!

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