

Welcome to a conceptual look at basic concepts in Algebra.

Today's Purpose...

1. Represent adding integers in 4 different ways
1. Model the concept of combining like terms using shapes to represent the variables and constants.
1. Model the distributive property using the Area Model and if time allows, Algebra Tiles.
1. Use a flow chart to solve linear equations.

Adding and Subtracting Integers

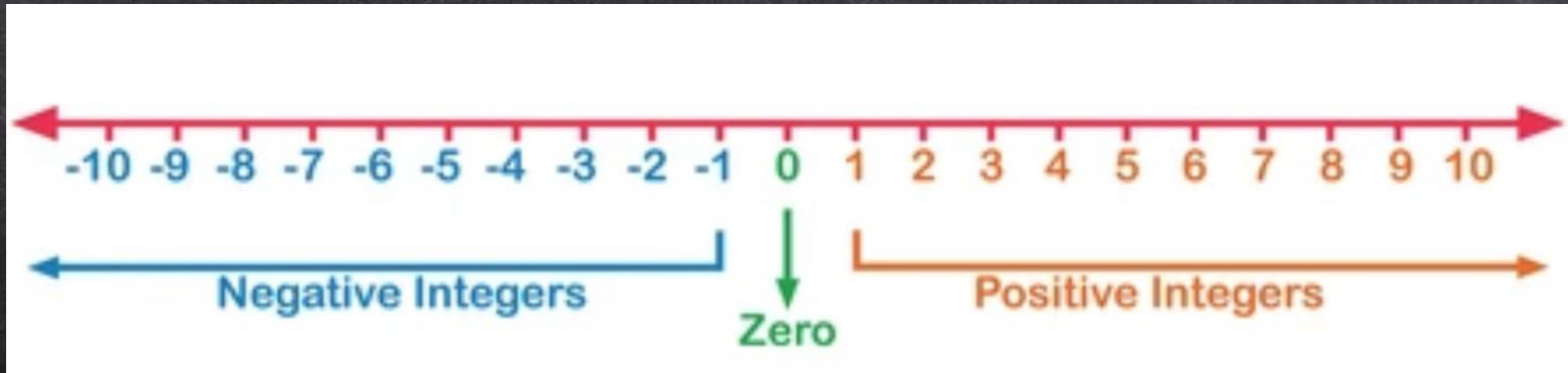
Four ways of modelling this concept

Number Line

Zero Pair

Relating to Money

A song that gets stuck in your head



Combining Like Terms... The Pre-Game

Reviewing the concepts of

Length



Area



Volume



Numbers



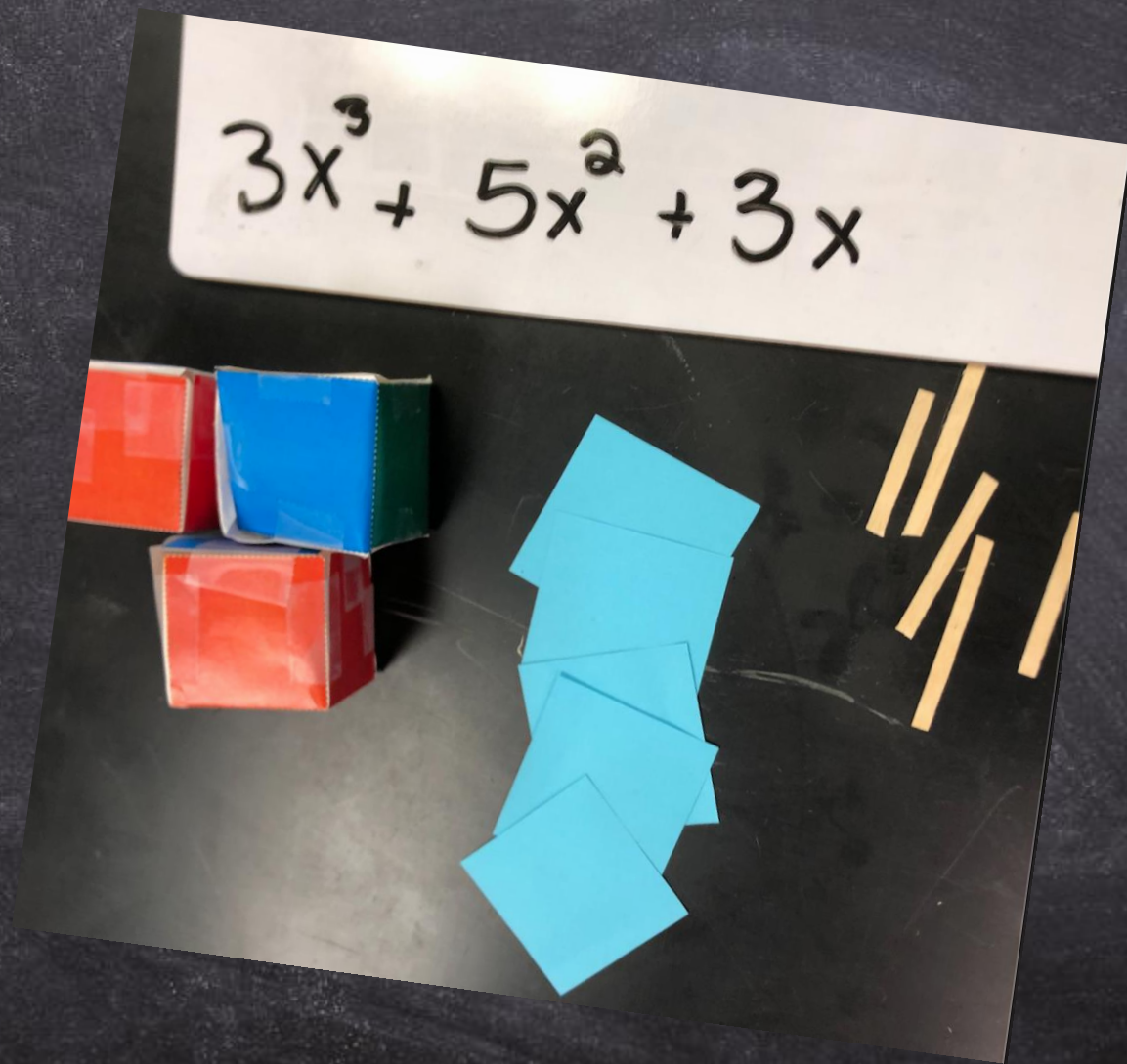
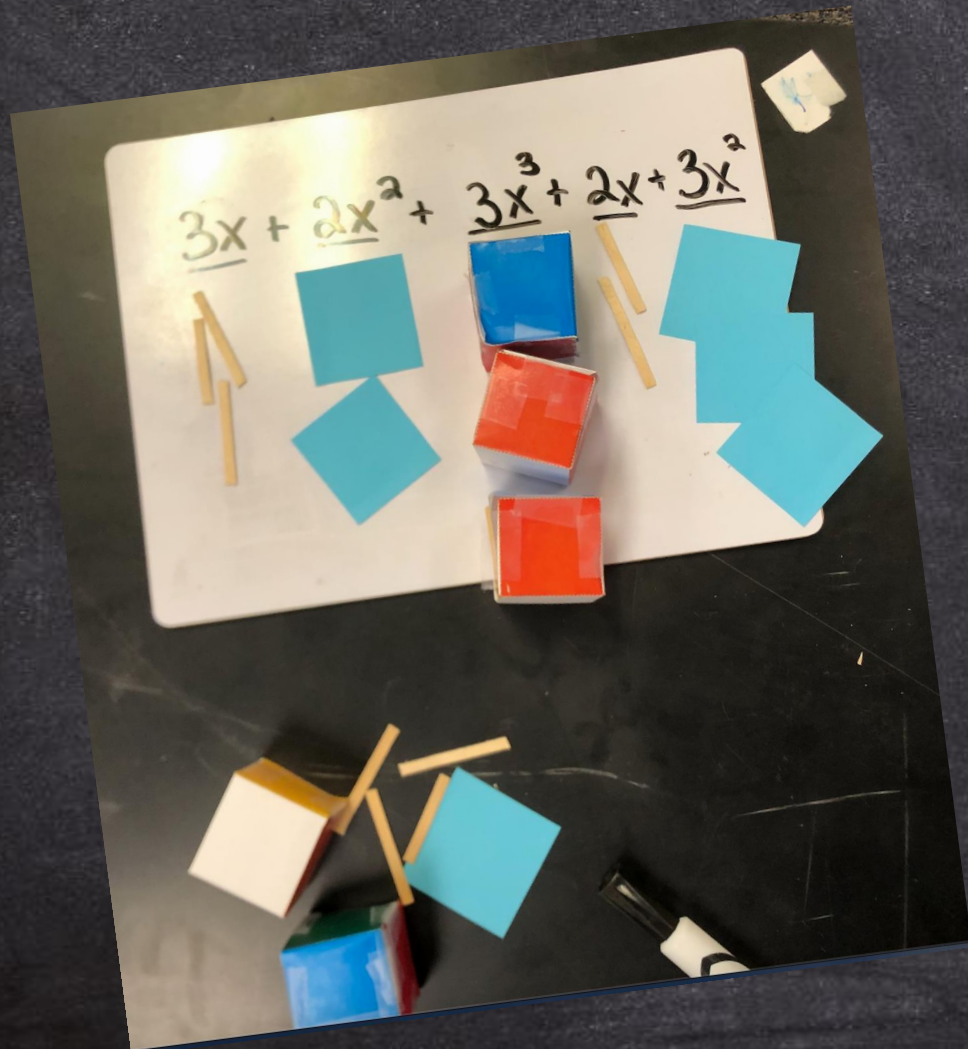
Combining Like Terms... The Shape of X

Chapter 1: Making Sense of the Problem...

$$2x^3 + 3x^2 + 4x + 5$$



Combining Like Terms...



Combining Like Terms... with Polypad

Chapter 2: Basic practice of the concept...

$$4x^3 + 3x^3 + 2x^2 + x^2$$

$$6 + 4x + 3$$

$$2x + 3x + 4x^2 + x$$

Combining Like Terms...The Adventures of ...

Chapter 3: Telling a story...and introducing new friends

$$5x^3 - 3x^3 + 2x^2 - x^2 + 4$$

$$3w^2 - 2w^2 + 3x^2 - x^2$$

Combining Like Terms... The Adventures of ...

Chapter 4: Plot twist... Students create their own

Students should create their own problems and swap them with other students... Either model or write expressions

Examples of Rules and Guidance

1. Create 5 problems
2. Each problem has -'s and +'s
3. 2 problems include different variables and/or exponents
4. Each problem has more than 5 terms

Combining Like Terms...All good things have an end...

Chapter 5: A real world-ish word problem.

Your students want to mail a box of apples and bananas to your Ukraine Relief Effort. The apples and bananas weights are different but all apples weigh the same and all bananas weigh the same.

Ted put in 5 apples, 3 bananas, Sue put in 7 apples and 4 bananas, and I ate 3 apples and 2 bananas

Write an expression that represents this situation then simplify the expression.

How could we expand this problem?

How could it get more real life?

Distributive Property using the Area Model

(The Pre-Game)

Understanding how to decompose numbers. 4×23

Understanding area

Modelling the Distributive Property using Area

Examples

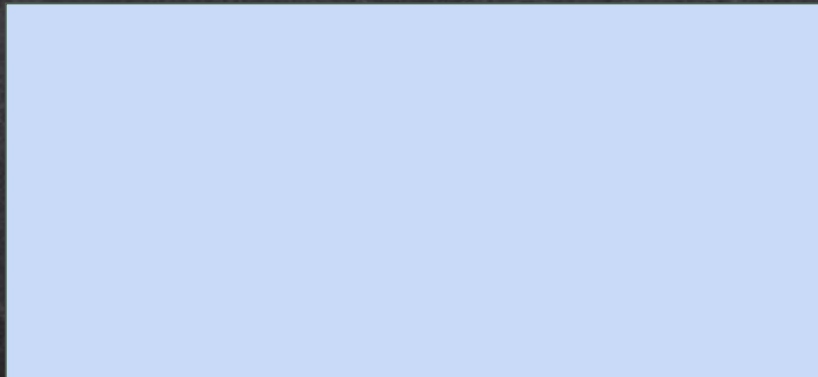
$$3(27)$$

$$2(x+5)$$

$$4(7x-5)$$

$$(8x+1)6$$

$$3w(4w-8)$$



What does this expression mean?

If this was a garden, what would x represent?

Can you evaluate the expressions given $x = ?$

Using Open Middle

DISTRIBUTIVE PROPERTY 4

Directions: Using the digits 0 to 9, at most one time each, to make a true equation.

$$9(\square a + \square b + \square) = \square\square a + \square\square b + \square$$

Hint

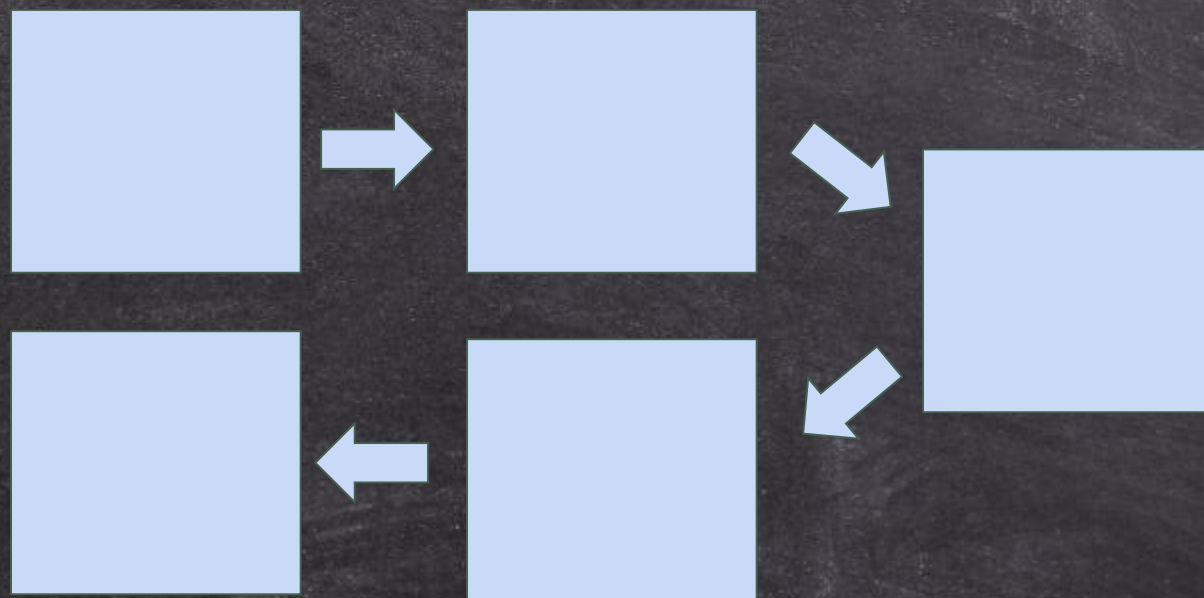


DISTRIBUTIVE PROPERTY 5

Directions: Using the digits 0 to 9 at most one time each, fill in the boxes to make an equation where both sides have the greatest possible value.

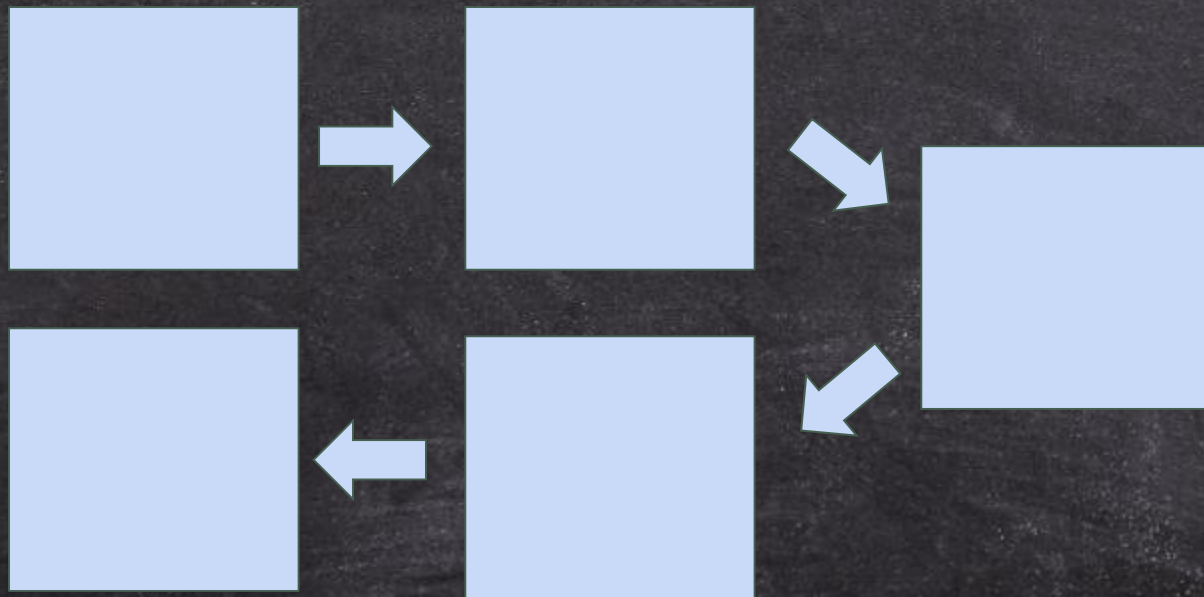
$$\square(\square + \square) = \square\square + \square\square$$

Solving Equations Using a Flow Chart



Solving Equations - A different approach CT State Curriculum

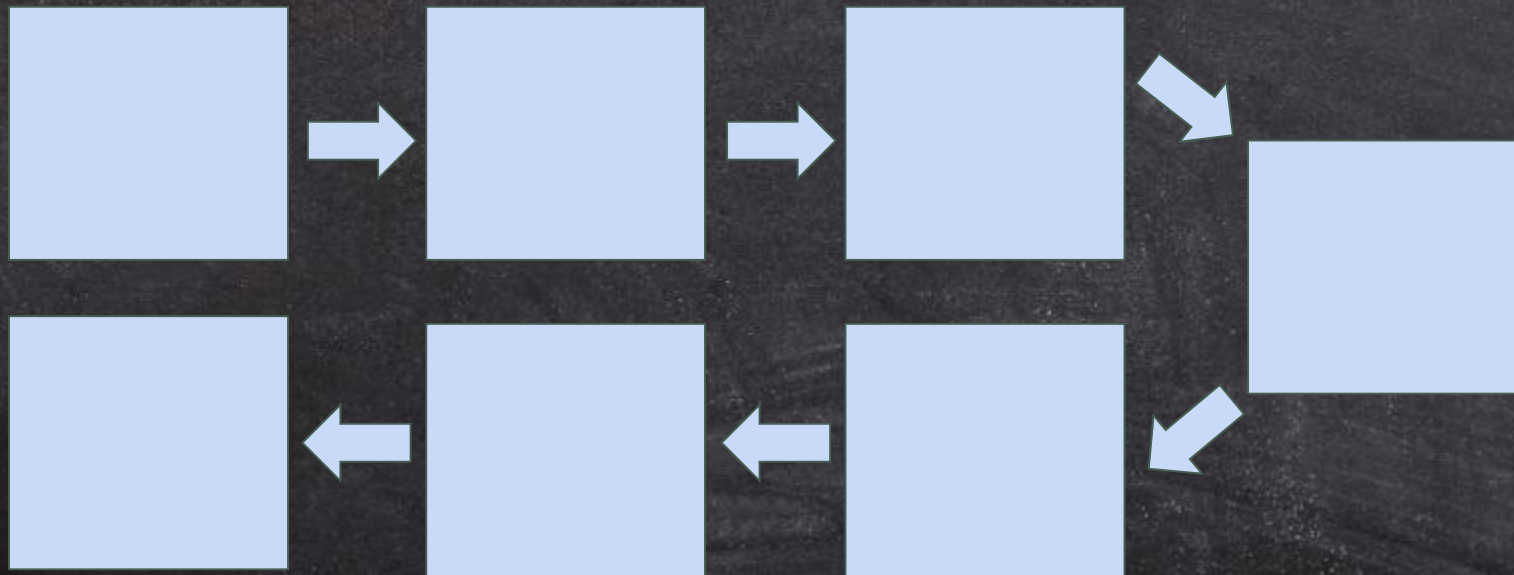
The Story of X (Single Step)



Solving Equations - The Story of X

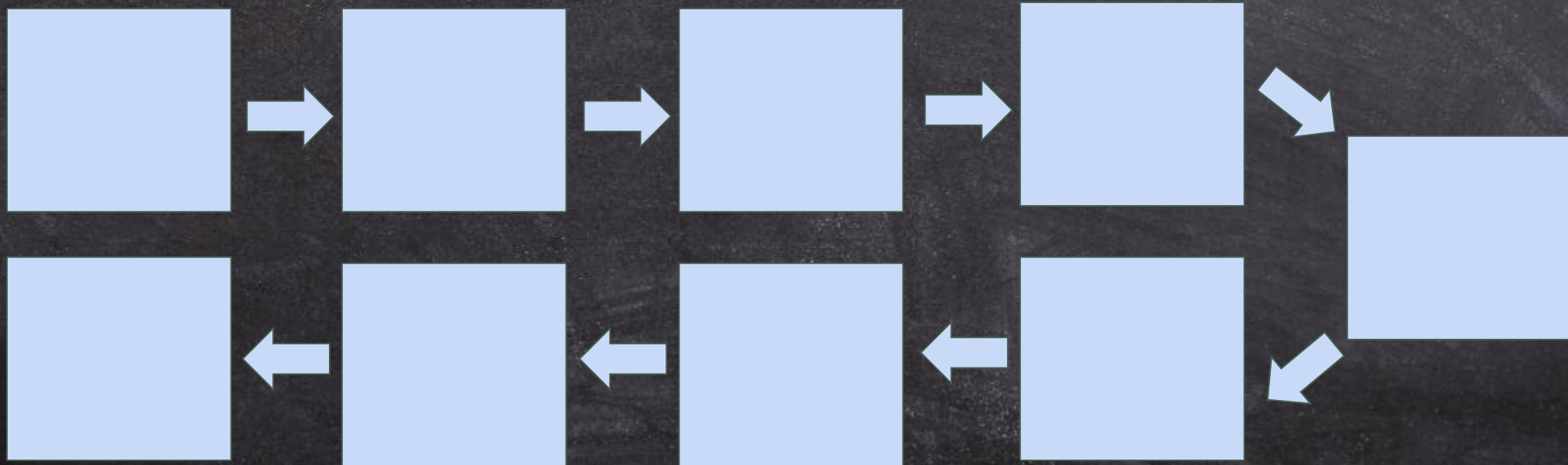
CT State Curriculum

The Story of X (Multi-Step)



Solving Equations - The Story of X

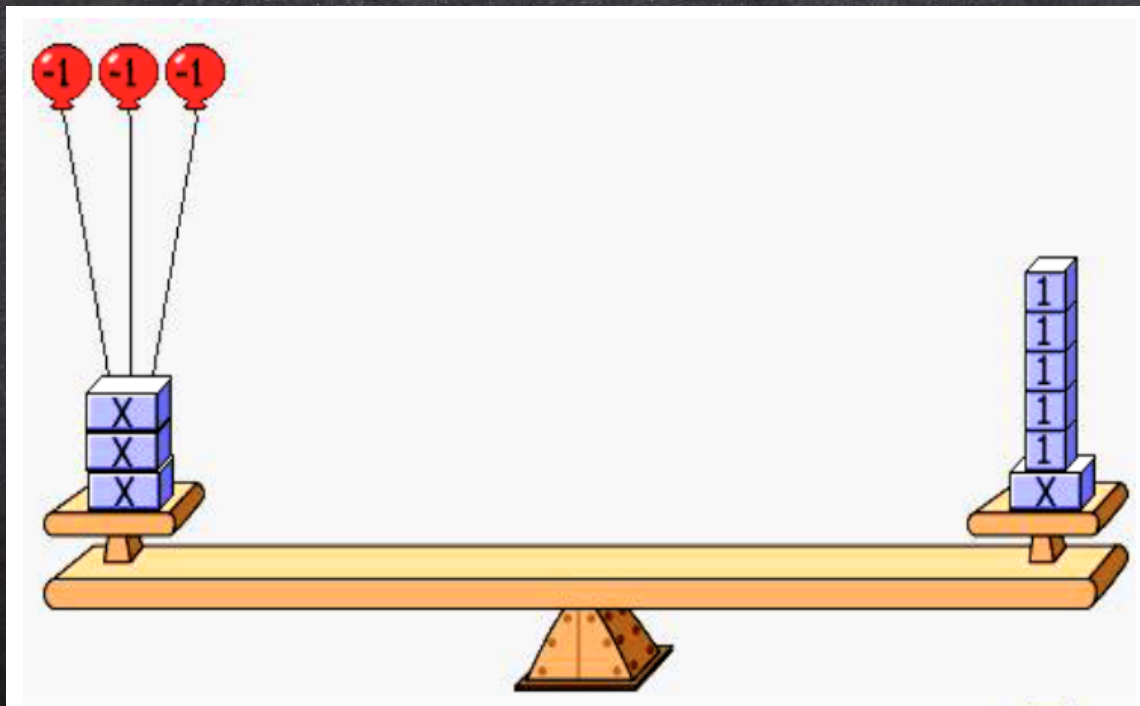
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Solving Equations -

Classic Approach... Keeping things balanced.

PBS Scale



Distributive Property using Algebra Tiles

Understand Algebra Tiles



Going the other way (Open Middle)

Given $30x-12$, If possible, find as many combinations of factors whose product would be $30x-12$. (Using integer coefficients and constants)

