# Using Manipulatives to Meet Common Core Math Standards 

Stacy Remphrey \& Megan Zimmermann Charles F. Patton Middle School Unionville-Chadds Ford School District Kennett Square, PA

## Topics Covered

- Expressions
- Distributive Property
- Combining like terms
- Fractions in expressions and equations
- Equations


## Objectives for the unit:

- Simplify expressions with like terms and fractions
- Apply the distributive property
- Solve 1 and 2-step equations
- Solve equations involving distributive property, combining like terms, and variables on both sides


## Why did we approach the unit this way?

- removing the "math-magic"
- easy entry point for all levels of students
- moving from concrete-pictorial-abstract

Concrete Level

## Model the expression with tiles


http://a4a.learnport.org/page/algebra-tiles

If you would like to access the online tiles http://bit.ly/1TyCBzr
http://a4a.learnport. org/page/algebra-tiles


## Model with equations


http://go.hrw.
com/math/midma/gradeconten t/manipulatives/Algebra_Tiles/ Algebra_Tiles.html
http://bit.ly/1BpE3w8

## What we found at this level

- Did not attempt to combine " $x$ " tiles with "one" tiles
- Chose appropriate inverse operations when solving equations
- Able to describe the manipulations and why they were appropriate
- Students at all levels were able to work through the problems


## Pictorial Level

## Examples

$$
\frac{x}{4}=-2
$$

Three-fourths of 4 x - $\mathbf{1 2}$

## Reference $x$ :



## Try these

- Draw and simplify

$$
3(x+2)-x
$$

- Draw and solve

$$
4 x+3=7
$$



$$
\begin{aligned}
& 3(x+2)-x \\
& x \\
& 3 x+6-x \\
& =2 x+6
\end{aligned}
$$



## Working in the pictorial level

- Students will want to jump to a "pattern" but they need to be able to explain "why"
- Increase in difficulty until a "math headache" is reached
- Movement toward the abstract is now demanded by the students to resolve the "math headache"

Abstract level

## Make them

## $-10(x+4)+28$

## want to move

## ratic formula

## $16-13 x=85$

## $5(6 x-9)=2 x+9$

## Watch out for...

- Students trying to follow a pattern. If they do, "break" their pattern.
- Students attempting to get to this stage too quickly without understanding what is actually happening.
- Students thinking that there is a certain sequence that must be followed.


## Now you get to

 become the student...
## Reflection

- How did you feel as the student?
- How did you see us behaving as the teacher?


## Thank you for attending our presentation!

Email: sremphrey@ucfsd.net
Twitter: @StacyRMath
Email: mzimmermann@ucfsd.net
Twitter: @MissZimmermann1

