

Increasing Engagement using Manipulatives

Elementary (part 1): 1:15 – 2:25 (Lynn Smith - JCPS)
Middle/High (part 2): 2:40 – 3:50 (Tim Truitt - JCPS)

Using the Area Model in Middle School with CSA Strategies

- *From base-10 blocks to algebra tiles:*
 1. Evaluate $86 + 45$ using base-10 blocks
 2. Evaluate $.86 + .45$ using base-10 blocks
 3. Simplify $(8x + 6) + (4x + 5)$ with algebra tiles

- In what ways might base-10 blocks be:
 1. similar to algebra tiles?
 2. different from algebra tiles?

Using the Area Model in Middle School with CSA Strategies

- What does division mean $\left(\frac{m}{n}\right)$:
 1. How many groups of size n from m ?
 2. How many out of m in each of n groups?
- Fractions: $\frac{3}{5} \div \frac{1}{2}$
- Decimals: $\frac{1.3}{0.3}$

Using the Area Model in Middle School with CSA Strategies

- *Solving Linear Equations (6th) using algebra tiles and fraction bars:*

1. $x - \frac{2}{3} = \frac{3}{4}$

2. $x + \frac{2}{3} = \frac{3}{4}$

3. $3x = 12$

4. $\frac{2}{3}x = \frac{1}{2}$

Using the Area Model in Middle School with CSA Strategies

- *Solving Linear Equations (7th) using algebra tiles and base-10 blocks:*

1. $3x - 5.3 = 4.9$

2. $-2x + 5.3 = -4.9$

3. $-1.5x - 7 = -2$

Using the Area Model in Middle School with CSA Strategies

- *Solving Linear Equations (8th) using algebra tiles:*

1. $-3(x + 4) = 2x + 13$

2. $2(x - 3) = 4x - 12$

Using the Area Model in High School with CSA Strategies

- In what ways might a square be better than a rectangle?
 1. What are the dimensions of a rectangle whose area is 36 square units?
 2. What are the dimensions of a square whose area is 36 square units?

Using the Area Model in High School with CSA Strategies

- Rewrite the following expressions in factored form using algebra tiles or a semi-concrete illustration:

1. $x^2 - 6x + 9$

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

3. $x^2 - \frac{2}{3}x + \frac{1}{9}$

Using the Area Model in High School with CSA Strategies

Solve the following equations using algebra tiles or a semi-concrete illustration:

1. $x^2 + 7x + 8 = 2$

2. $x^2 - 6x - 1 = -10$

3. $x^2 - 4x + 5 = 0$

Using the Area Model in High School with CSA Strategies

Identify key features of each conic section and sketch a picture of the figure:

1. $x^2 + 6x + y^2 - 4y = 12$

2. $x^2 - 2x + 4y^2 + 8y = -1$