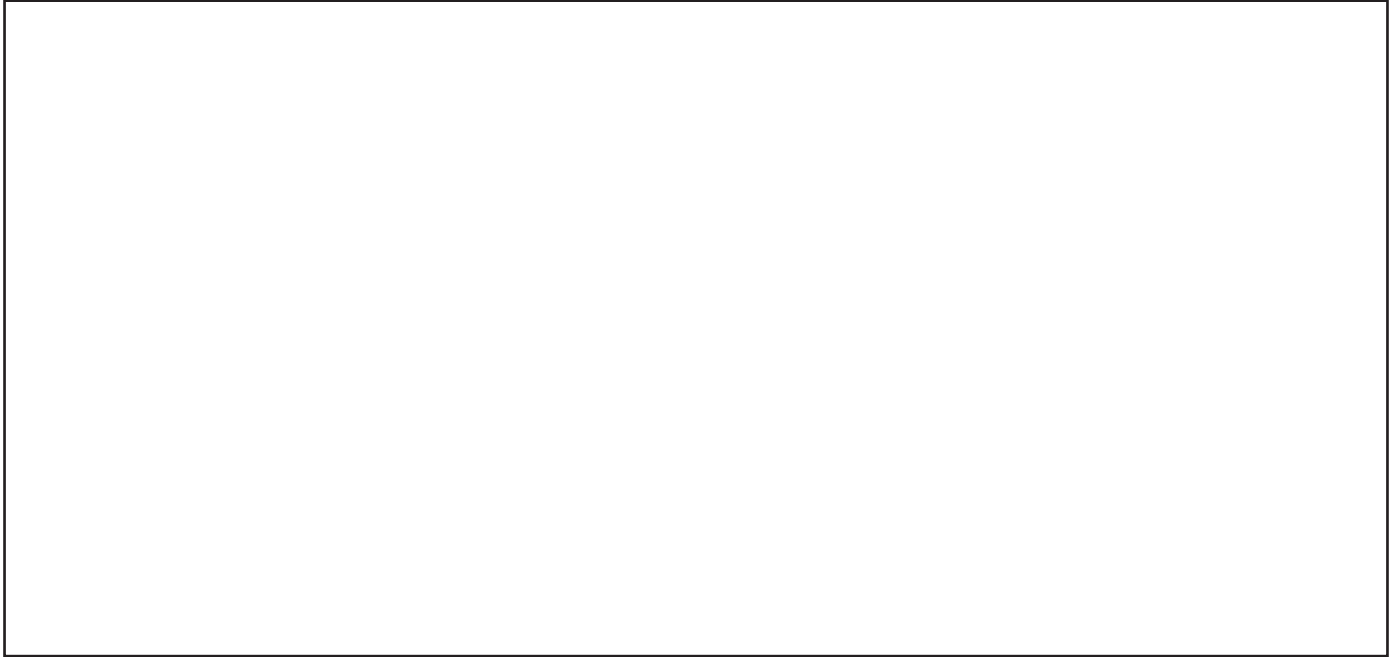


# Evidence-Based Instructional Practices for Mathematics

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## Mathematical Progressions

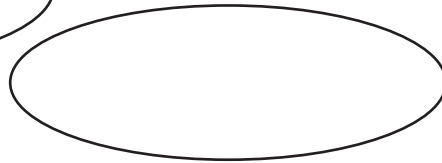
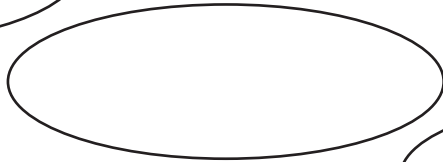
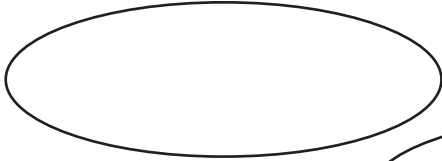


## Critical Content

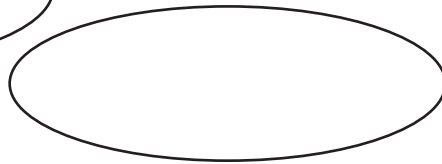
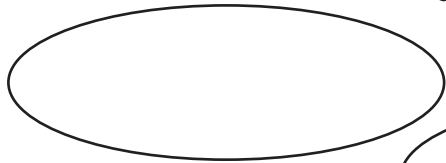


# Instructional Platform

## Instructional Delivery



## Instructional Strategies



# Explicit Instruction

Research and Information



What are the strengths of your teachers?



What are the opportunities for growth?



What are your immediate next steps?

# Explicit Instruction

MODELING

PRACTICE

SUPPORTS



# Math Vocabulary

Research and Information

## Use Formal Mathematics Language

Instead of that...	Say this...



## Math Vocabulary

Use Terms With Precision

Strategies for Teaching Mathematics Language



What are the strengths of your teachers?



What are the opportunities for growth?

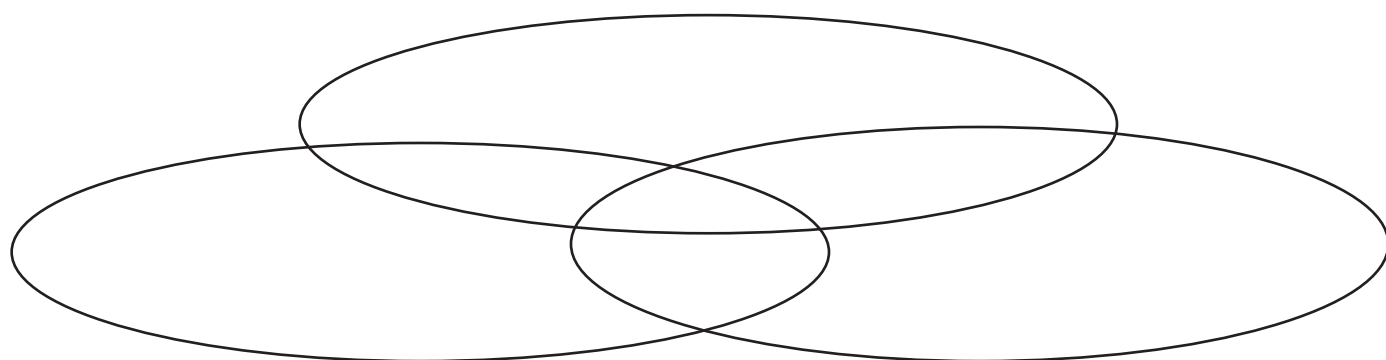


What are your immediate next steps?



# Representations

Research and Information



# Representations



What are the strengths of your teachers?



What are the opportunities for growth?



What are your immediate next steps?



# Fluency

Research and Information

## Types of Fluency

Type	Memorization?	
	Yes	No



# Fluency with Facts

Addition

Subtraction

Multiplication

Division



# Fluency with Computation

Addition

Subtraction

Multiplication

Division



# Fluency

## Strategies for Building Fluency



What are the strengths of your teachers?



What are the opportunities for growth?



What are your immediate next steps?

# Word Problems

Research and Information

## Word Problems

## Attack Strategies

### SOLVE

- Study the problem.
- Organize the facts.
- Line up the plan.
- Verify the plan with computation.
- Examine the answer.

### R-CUBES

- Read the problem.
- Circle key numbers.
- Underline the question.
- Box action words.
- Evaluate steps.
- Solve and check.

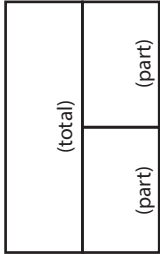
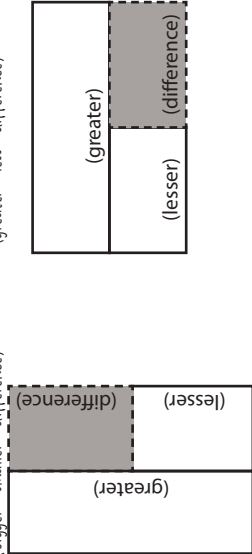
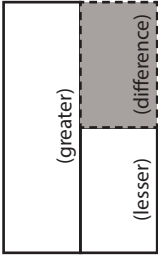
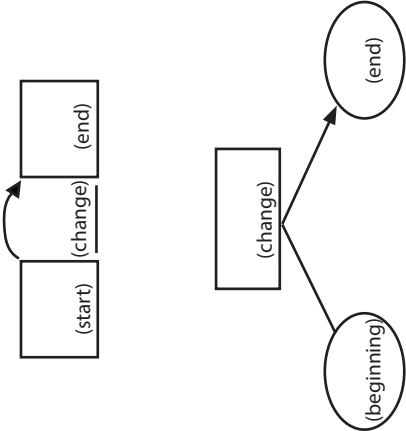
**UPS✓**  
**UNDERSTAND**  
Read and explain.

**P**LAN  
How will you solve the problem?

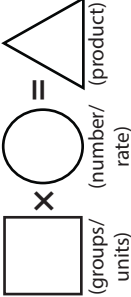

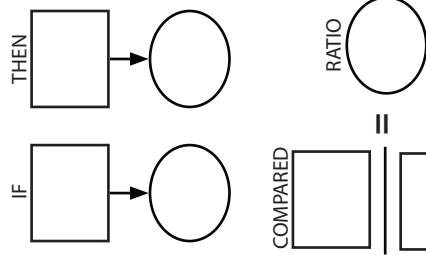
**S**OLVE  
Set up and do the math!

✓**C**CHECK  
Does your answer make sense?



Schema and Definition	Equations and Graphic Organizers	Examples	Variations
<p>Total (Combine; part-part-whole) Parts combined for a sum</p>	<p><math>P1 + P2 = T</math> (part + part = total)</p> 	<p>Sum unknown: Lyle has 11 red apples and 18 green apples. How many apples does Lyle have altogether?</p> <p>Part unknown: Lyle has 29 red and green apples. If 11 of the apples are red, how many green apples does Lyle have?</p>	<p>More than two parts: Lyle has 34 apples. Of the apples, 11 are red, 18 are green, and the rest are yellow. How many yellow apples does Lyle have?</p>
<p>Difference (Compare) Sets compared for a difference</p>	<p><math>B - s = D</math> (bigger - smaller = difference)</p>  <p><math>G - L = D</math> (greater - less = difference)</p> 	<p>Difference unknown: Sasha wrote 85 words in her essay, and Tabitha wrote 110 words. How many fewer words did Sasha write than Tabitha?</p> <p>Bigger/greater unknown: Tabitha wrote 25 more words than Sasha. If Sasha wrote 85 words, how many words did Tabitha write?</p> <p>Smaller/lesser unknown: Tabitha wrote 110 words in her essay. Sasha wrote 25 words fewer than Tabitha. How many words did Sasha write?</p>	<p>(None)</p>
<p>Change (Join; Separate) An amount that increases or decreases</p>	<p><math>ST \ +/- \ C = E</math> (start +/- change = end)</p> 	<p>End (increase) unknown: Jorge had \$52. Then, he earned \$16 babysitting. How much money does Jorge have now?</p> <p>Change (increase) unknown: Jorge had \$52. Then, he earned some money babysitting. Now, Jorge has \$68. How much did Jorge earn babysitting?</p> <p>Start (increase) unknown: Jorge has some money, and then he earned \$16 for babysitting. Now, Jorge has \$68. How much money did he have to start with?</p> <p>End (decrease) unknown: Jorge had \$52. Then, he spent \$29 at the ballpark. How much money does Jorge have now?</p> <p>Change (decrease) unknown: Jorge had \$52 but spent some money when he went to the ballpark. Now, Jorge has \$23. How much did Jorge spend at the ballpark?</p> <p>Start (decrease) unknown: Jorge had some money. Then, he spent \$29 at the ballpark and has \$23 left. How much money did Jorge have before going to the ballpark?</p>	<p>Multiple changes: Jorge had \$78. He stopped and bought a pair of shoes for \$42 and then he spent \$12 at the grocery. How much money does Jorge have now?</p>



Schema and Definition	Graphic Organizers	Examples	Variations
<p>Equal Groups (Vary)</p> <p>A number of equal sets or units</p>	<p><math>GR \times N = P</math></p> 	<p>Product unknown:</p> <p>Maria bought 5 cartons of eggs with 12 eggs in each carton. How many eggs did Maria buy?</p> <p>Groups unknown:</p> <p>Maria bought 60 eggs. The eggs were sold in cartons with 12 eggs each. How many cartons of eggs did Maria buy?</p>	<p>With rate:</p> <p>Maria bought 5 cartons of eggs. Each carton cost \$2.95. How much did Maria spend on eggs?</p>
<p>Comparison</p> <p>One set as a multiple or part of another set</p>	<p><math>S \times T = P</math></p> 	<p>Product unknown:</p> <p>Malik picked 7 flowers. Danica picked 3 times as many flowers as Malik. If Danica picked 21 flowers, how many flowers did Malik pick?</p> <p>Set unknown:</p> <p>Danica picked 3 times as many flowers as Malik. If Danica picked 21 flowers, how many flowers did Malik pick?</p> <p>Times unknown:</p> <p>Malik picked 7 flowers. Danica picked 21 flowers. How many times more flowers did Danica pick?</p>	<p>With fraction:</p> <p>Malik picked 25 red and yellow flowers. If 1/5 of the flowers were yellow, how many were red?</p>
<p>Ratios/Proportions (Percentages; Unit Rate)</p> <p>Relationships among quantities</p> <p>Ratio</p>		<p>Subject unknown:</p> <p>Sally typed 56 words in 2 minutes. How many words could Sally type in 7 minutes?</p> <p>Object unknown:</p> <p>Sally typed 56 words in 2 minutes. How many minutes would it take Sally to type 192 words?</p> <p>Base unknown:</p> <p>Justin baked cookies and brownies. The ratio of cookies to brownies was 3:5. If he baked 15 cookies, how many brownies did he bake?</p> <p>Compared unknown:</p> <p>Justin baked cookies and brownies. The ratio of cookies to brownies was 3:5. If he baked 25 brownies, how many cookies did he bake?</p> <p>Ratio unknown:</p> <p>Justin baked 15 cookies and 25 brownies. What's the ratio of cookies to brownies?</p>	<p>With percentage:</p> <p>Watson received an 80% on his science quiz. If the test had 40 questions, how many questions did Watson answer correctly?</p> <p>With unit rate:</p> <p>Paula bought 5 boxes of markers. She spent \$9.75. What is the price of one box of markers?</p>

Material collected from: Jitendra, DiPipi, & Perron-Jones, 2002; Jitendra & Star, 2011; Jitendra et al., 2009; Van de Walle et al., 2013; Xin, Jitendra, & Deatline-Buchman, 2005; Xin & Zhang, 2009.





## Word Problems



What are the strengths of your teachers?



What are the opportunities for growth?



What are your immediate next steps?

# Checklist

Evidence-Based Practice	Description; Look-Fors

