



# ILLINOIS COMPREHENSIVE NUMERACY PLAN SUMMIT

June 3, 2025

# Welcome & Introduction

**Dr. Tony Sanders**

State Superintendent of  
Education

Illinois State Board of Education

# Housekeeping

- **Numeracy Summit Booklet**
  - Note Catchers
- **Materials**
  - Cellular device/laptop
  - Discussion Board Padlet
  - ISUNET WiFi
- **Important Places**

# Agenda

8:00-8:55 a.m.	Registration
9:00-9:15 a.m.	Welcome & Introduction
9:15-10:00 a.m.	The National Lens on Numeracy- Figuring Out Fluency: Beyond Facts & Algorithms
10:00-11:00 a.m.	Needs Assessment Summary & Table Talk: Unpacking Key Issues
11:00-11:45 a.m.	Panel #1 Discussion: The Big Picture of Mathematics Instruction
11:45-12:15 p.m.	The State Lens on Numeracy: From Literacy to Numeracy
12:15-1:00 p.m.	Working Lunch & Collaboration: Conversations on Key Findings
1:00-1:45 p.m.	Panel #2 Discussion: Implementation & Support
1:45-2:00 p.m.	Summary & Next Steps



# The National Lens on Numeracy

## Figuring Out Fluency: Beyond Facts and Algorithms



John SanGiovanni

# Numeracy from Fluency

John SanGiovanni

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[X @JohnSanGiovanni](https://twitter.com/JohnSanGiovanni)



# NUMERACY

Applying mathematics to real-world contexts in order to make sense of the world and solve problems.

from

# FLUENCY

Computation and manipulation of numbers.

Articulate big  
ideas about  
fluency.



Our  
time

**Fluency isn't basic.**

**Big  
Idea  
#1**



$$49 + 27$$

$$\begin{array}{r} 49 \\ + 27 \\ \hline 76 \end{array} \quad \begin{array}{r} 49 \\ + 27 \\ \hline 76 \end{array}$$

I regrouped.  
I added 9+7  
which equals  
16 and you  
put the 6  
down and  
carry the 1.  
then you add  
1+4+2 which  
equals 7 so  
it is 76.

$$\begin{array}{r} 40 \\ + 20 \\ \hline 60 \end{array} \quad \begin{array}{r} 7 \\ + 9 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 60 \\ + 16 \\ \hline 76 \end{array}$$

I split the  
ones and the  
tens. I added  
40+20 which  
equals 60.  
Then you ac  
7+9 which  
equals 16.  
Then you  
add 16+60  
which equals  
76.

$$\begin{array}{r} 49 \\ + 27 \\ \hline 76 \end{array}$$

Handwritten diagram illustrating the addition process:

$$\begin{array}{r} 49 \\ + 7 \\ \hline 56 \\ + 20 \\ \hline 76 \end{array}$$

The number 27 is circled and split into 7 and 20. The 7 is added to 49 to get 56, and then 20 is added to 56 to get 76.

I add the 7 to 49 so 27 will be easier to work with. So  $49 + 7 = 56 + 20 = 76$ .



$$40 + 20 = 60$$

$$9 + 7 = 16$$

76

$$49 + 50$$

$$+ 27 \quad 4 + 30$$

80

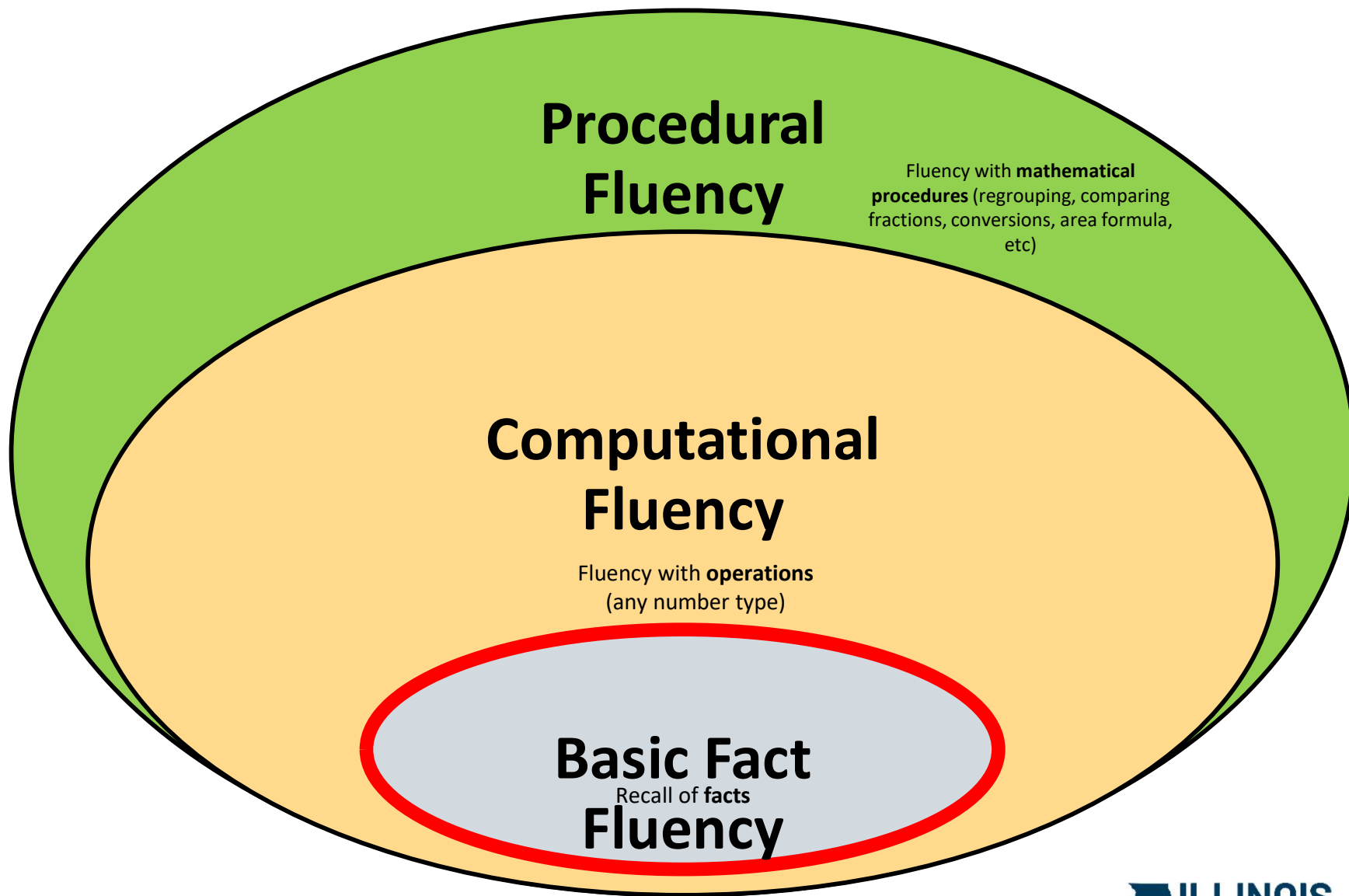
76

$$49 + 27 =$$

$$50 + 26 = 76$$

$$\begin{array}{r} 49 \\ + 27 \\ \hline 166 \end{array}$$

I added the numbers and got 166.



# Take a Moment to Compare Each Set

Procedural  
Fluency  
Fluency with mathematical procedures (regrouping, comparing fractions, conversions, area formula, etc)

A

$$\frac{2}{7} \bigcirc \frac{3}{5}$$

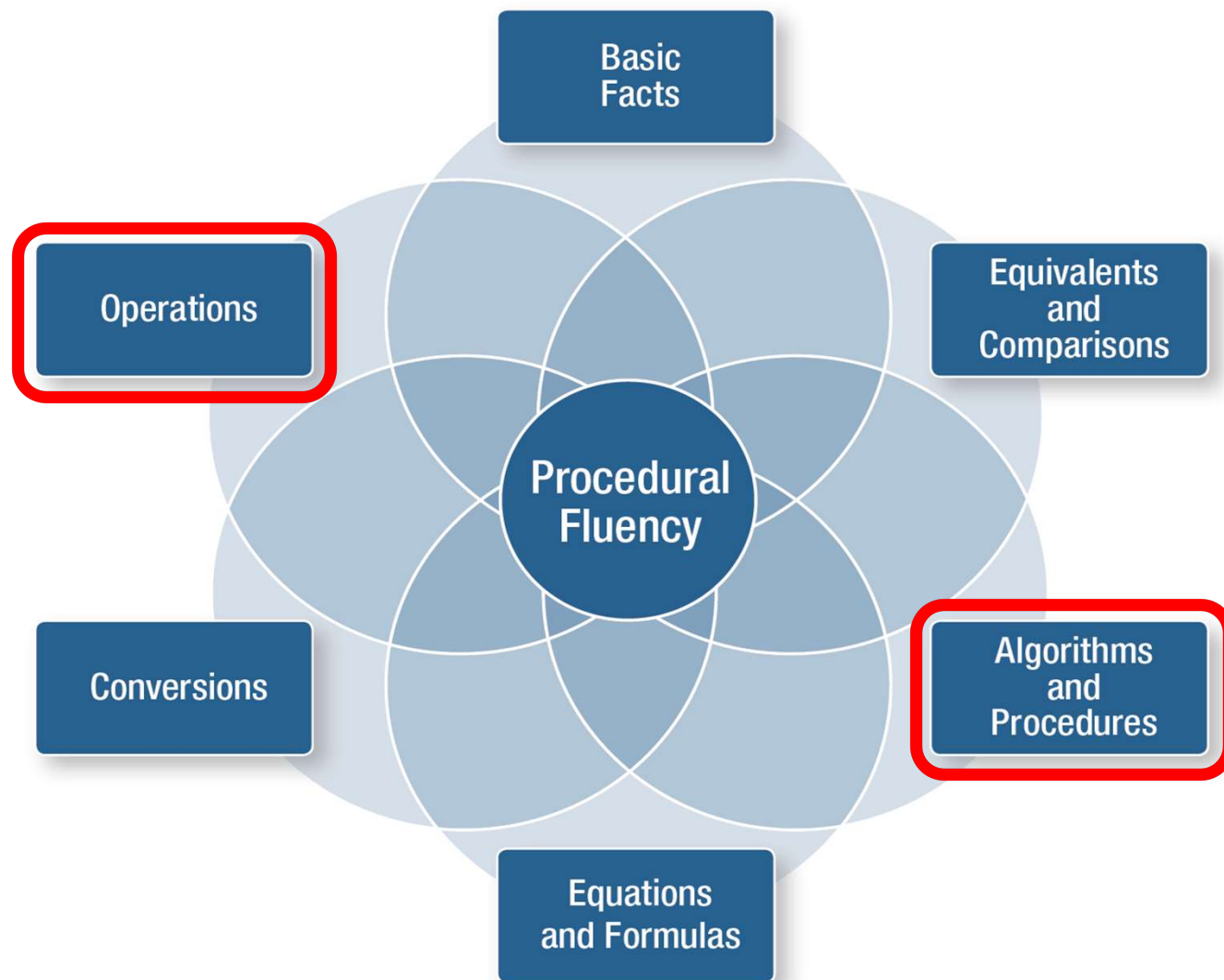
B

$$\frac{14}{18} \bigcirc \frac{14}{20}$$

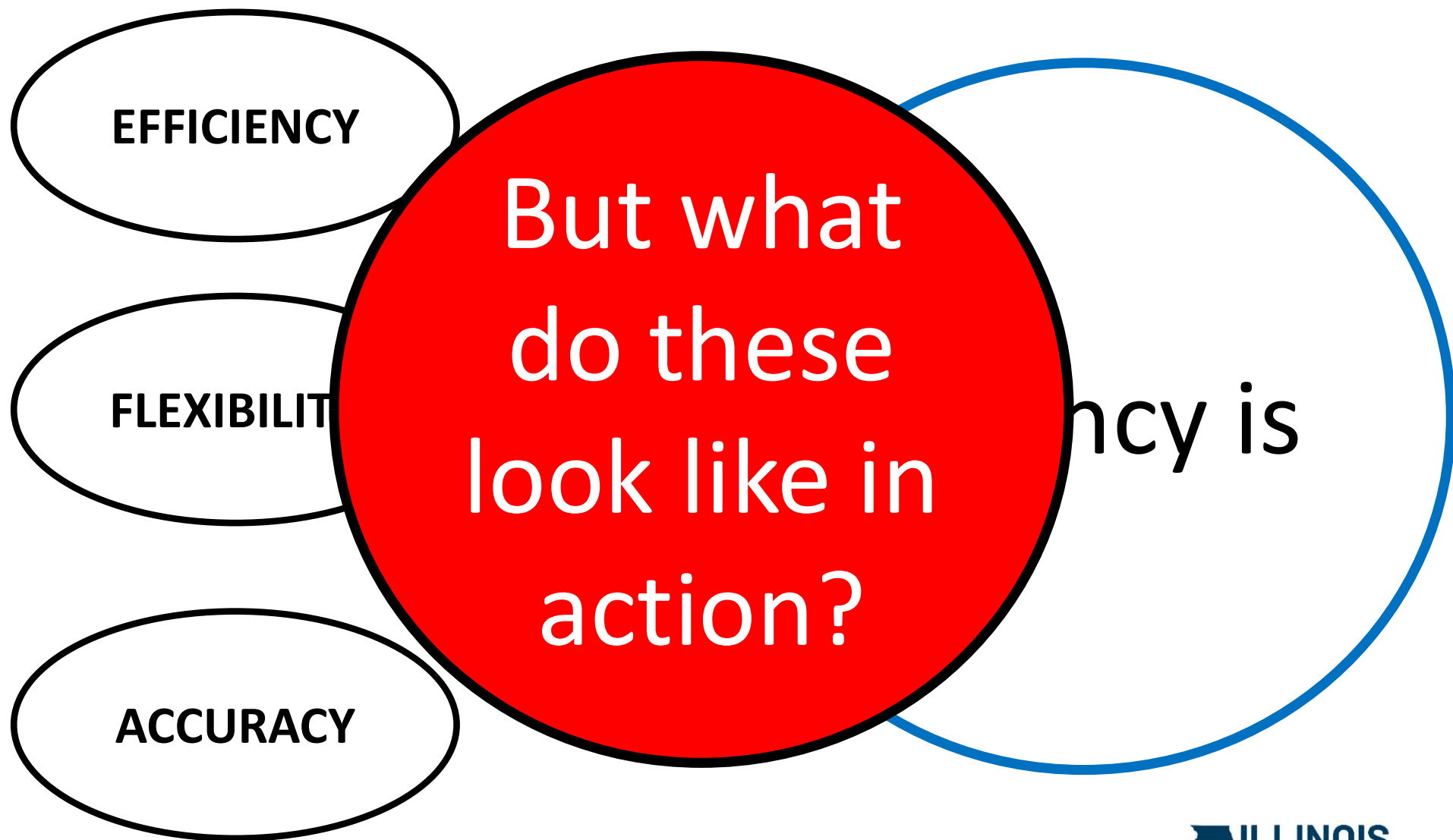
C

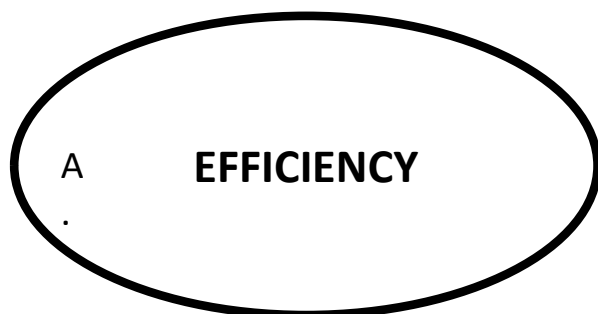
$$\frac{13}{14} \bigcirc \frac{15}{16}$$

Basic Fact  
Fluency  
Recall of facts



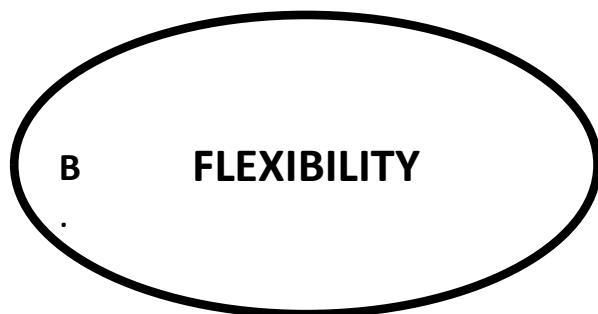
Featured Today





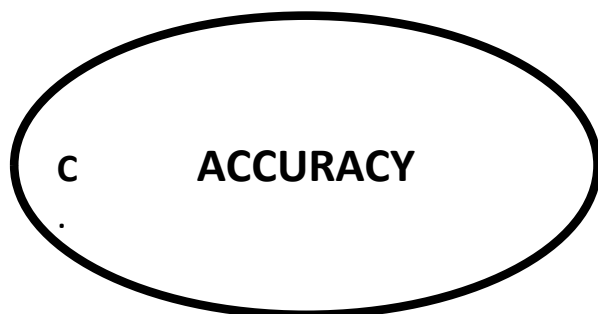
<sup>1</sup> Trades out or adapts strategy

<sup>4</sup> Completes steps accurately



<sup>2</sup> Gets correct answer

<sup>5</sup> Selects an appropriate strategy

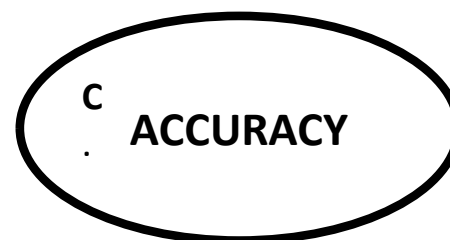
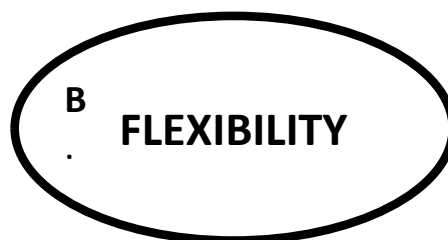


<sup>3</sup> Solves in a reasonable amount of time

<sup>6</sup> Applies a strategy to a new problem

Component  
s

## Procedural Fluency



**5** Selects an appropriate strategy

**1** Trades out or adapts strategy

**3** Solves in a reasonable amount of time

Applies a strategy to a new problem type  
**6**

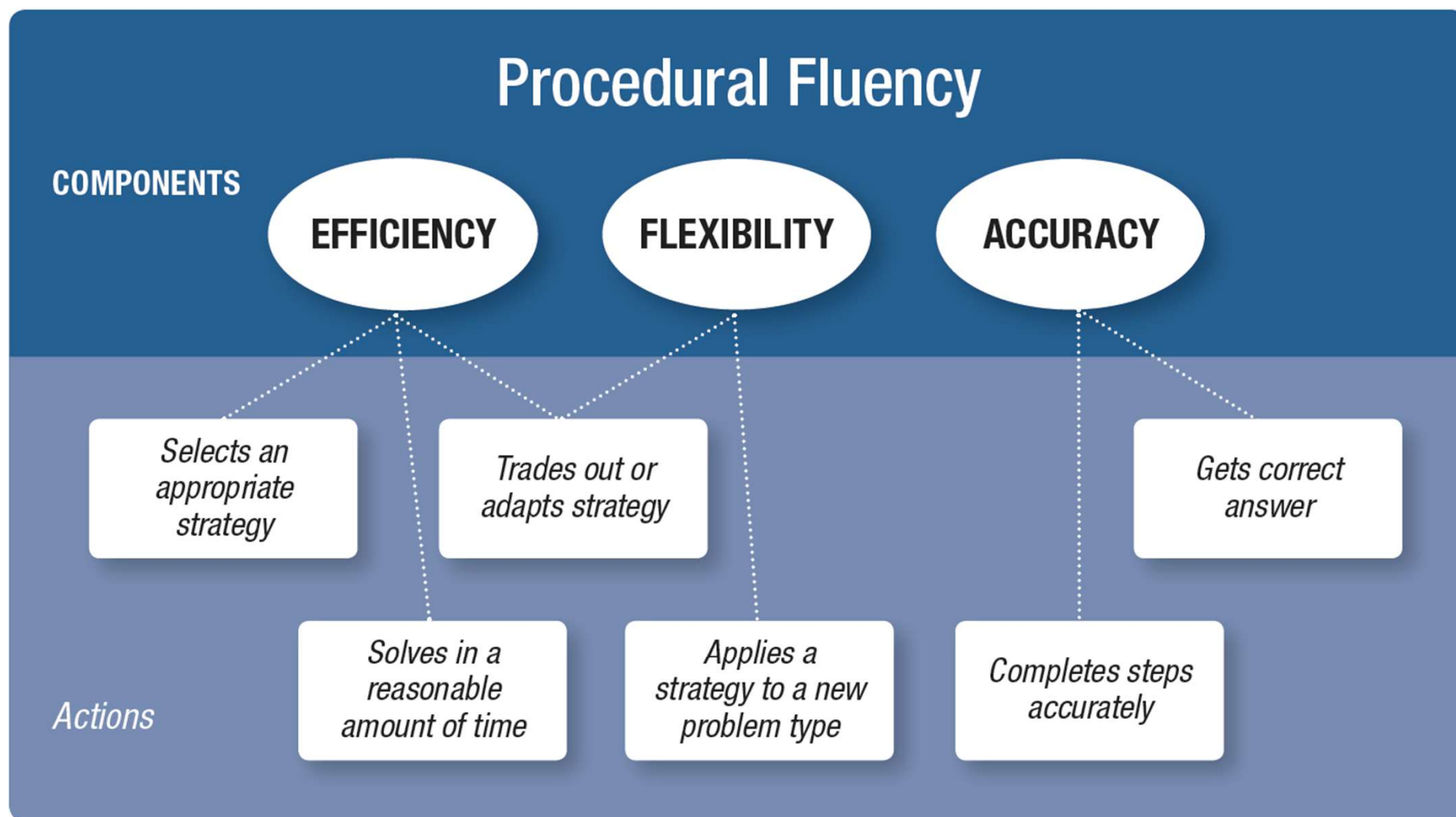
**2** Gets correct answer

**4** Completes steps accurately

Actions



**FIGURE 1.2** ● Procedural Fluency Components and Related Fluency Actions



Figuring out Fluency (2021) by J. Bay-Williams & J. SanGiovanni

Fluency isn't basic.

**Can it be realized if it is  
not understood fully?**



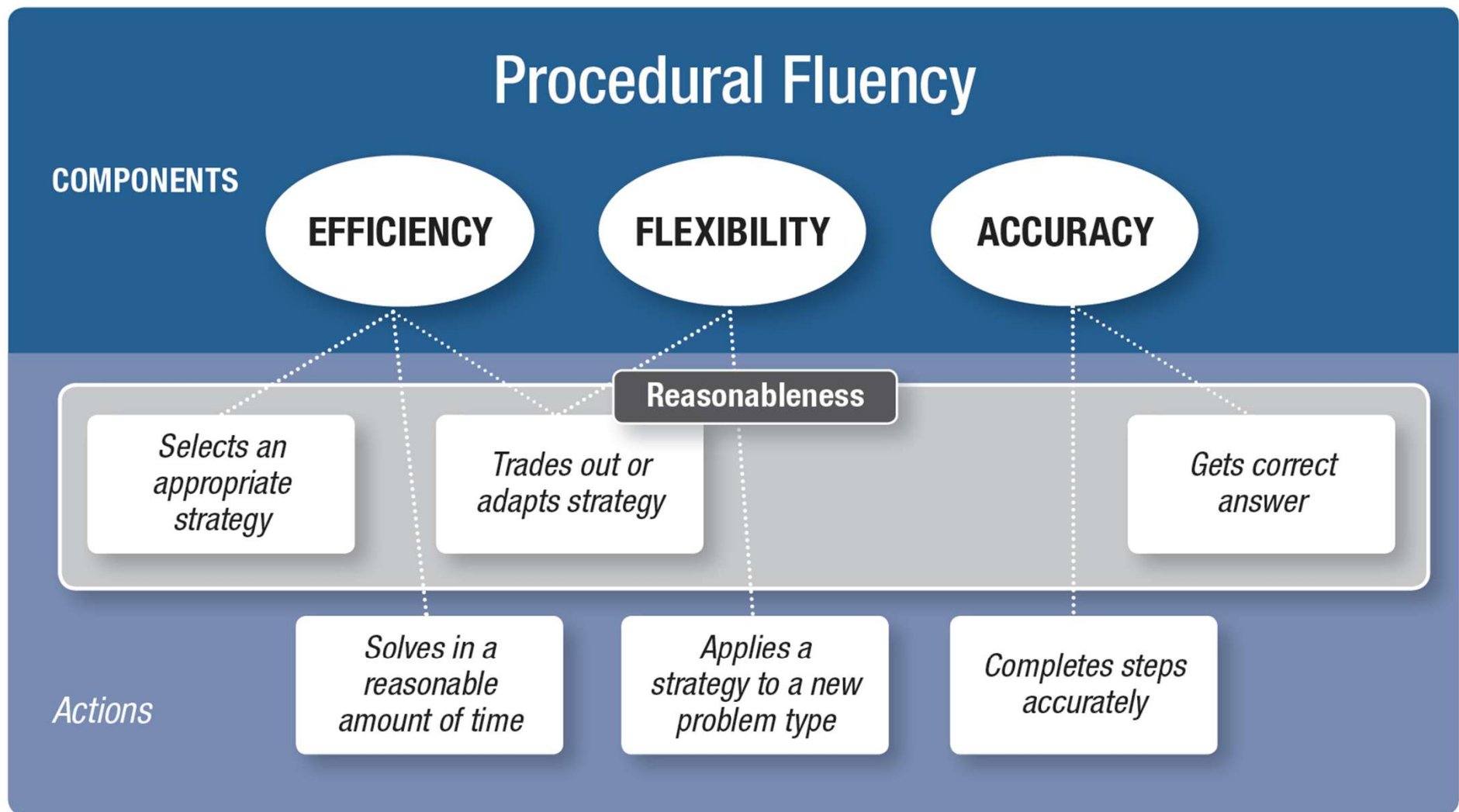
Big  
Idea  
#1

**Reasonable plays a role.**

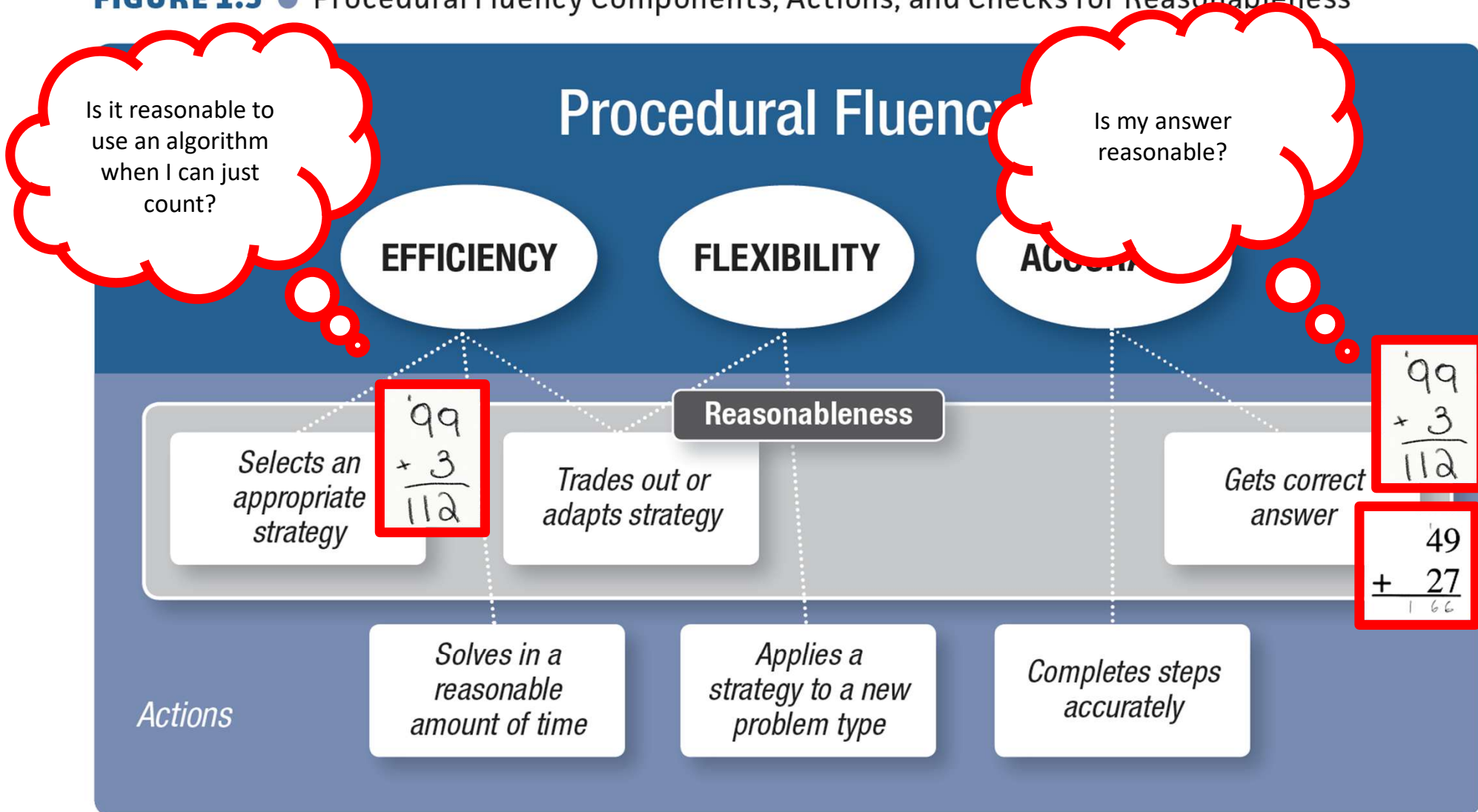
**Big  
Idea  
#2**

$$5 \left( x + \frac{1}{2} \right) = 25$$


**FIGURE 1.5** ● Procedural Fluency Components, Actions, and Checks for Reasonableness





**FIGURE 1.5** • Procedural Fluency Components, Actions, and Checks for Reasonableness



**FIGURE 1.6** ● Choose, Change, Check Reflection Card for Students

CHECKS FOR REASONABLENESS	
<p>Choose</p> 	<div><math>49 + 27</math></div> <div><math>\frac{14}{18} \bigcirc \frac{14}{20}</math></div> <div><math>5 \left( x + \frac{1}{2} \right) = 25</math></div>
<p>Is this something I can do in my head?</p> <p>What strategy makes sense for these numbers?</p>	

**FIGURE 1.6** ● Choose, Change, Check Reflection Card for Students

CHECKS FOR REASONABLENESS		
<div>Choose</div> <div></div>	<div>Change</div> <div></div>	<div><math>49 + 27</math></div> <div><math>\frac{14}{18} \bigcirc \frac{14}{20}</math></div> <div><math>5 \left( x + \frac{1}{2} \right) = 25</math></div>
<div>Is this something I can do in my head?</div> <div>What strategy makes sense for these numbers?</div>	<div>Is my strategy going well, or should I try a different approach?</div> <div>Does my answer so far seem reasonable?</div>	






**FIGURE 1.6** • Choose, Change, Check Reflection Card for Students




49 + 27

$5\left(x + \frac{1}{2}\right) = 25$

$\frac{14}{18} \bigcirc \frac{14}{20}$

CHECKS FOR REASONABLENESS		
<div>Choose</div> <div></div>	<div>Change</div> <div></div>	<div>Check</div> <div></div>
<div>Is this something I can do in my head?</div> <div>What strategy makes sense for these numbers?</div>	<div>Is my strategy going well, or should I try a different approach?</div> <div>Does my answer so far seem reasonable?</div>	<div>Is my answer close to what I anticipated it might be?</div> <div>How might I check my answer?</div>

**FIGURE 1.6** ● Choose, Change, Check Reflection Card for Students

CHECKS FOR REASONABLENESS		
<p>Choose</p> 	<p>Change</p> 	<p>Check</p> 
<p>Is this something I can do in my head?</p> <p>What strategy makes sense for these numbers?</p>	<p>Is my strategy going well, or should I try a different approach?</p> <p>Does my answer so far seem reasonable?</p>	<p>Is my answer close to what I anticipated it might be?</p> <p>How might I check my answer?</p>



## Over/Under 50

A

$$2.7 \times 15.8$$

B

$$10.25 \times 4.99$$

C

$$50.5 \div .9$$

# Over/Under 50

A

$$29 + 19$$

B

$$27 + 26$$

C

$$9 + 38$$

# Over/Under 5

A

$$2.9 + 1.9$$

B

$$2.7 + 2.6$$

C

$$0.9 + 3.8$$

# Over/Under 1

A

$$\frac{5}{8} + \frac{4}{8}$$

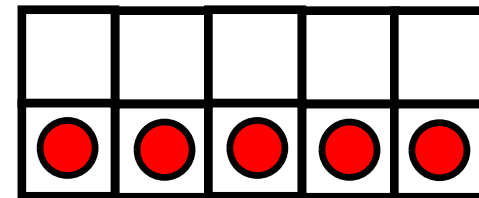
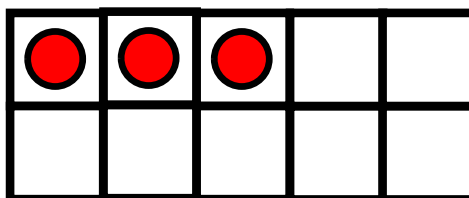
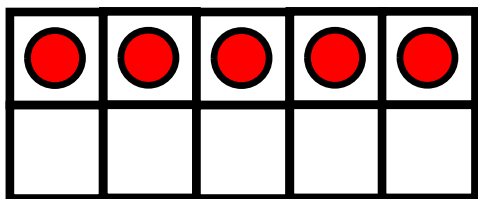
B

$$\frac{4}{10} + \frac{3}{4}$$

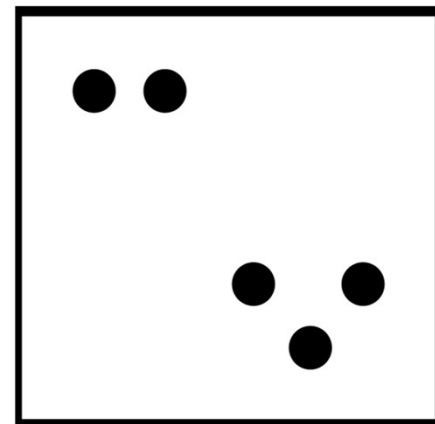
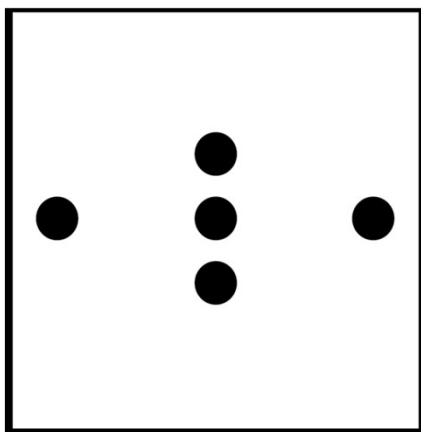
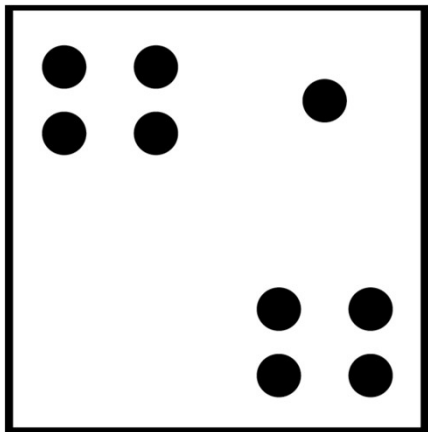
C

$$1\frac{3}{5} - \frac{3}{8}$$

# Over/Under 10

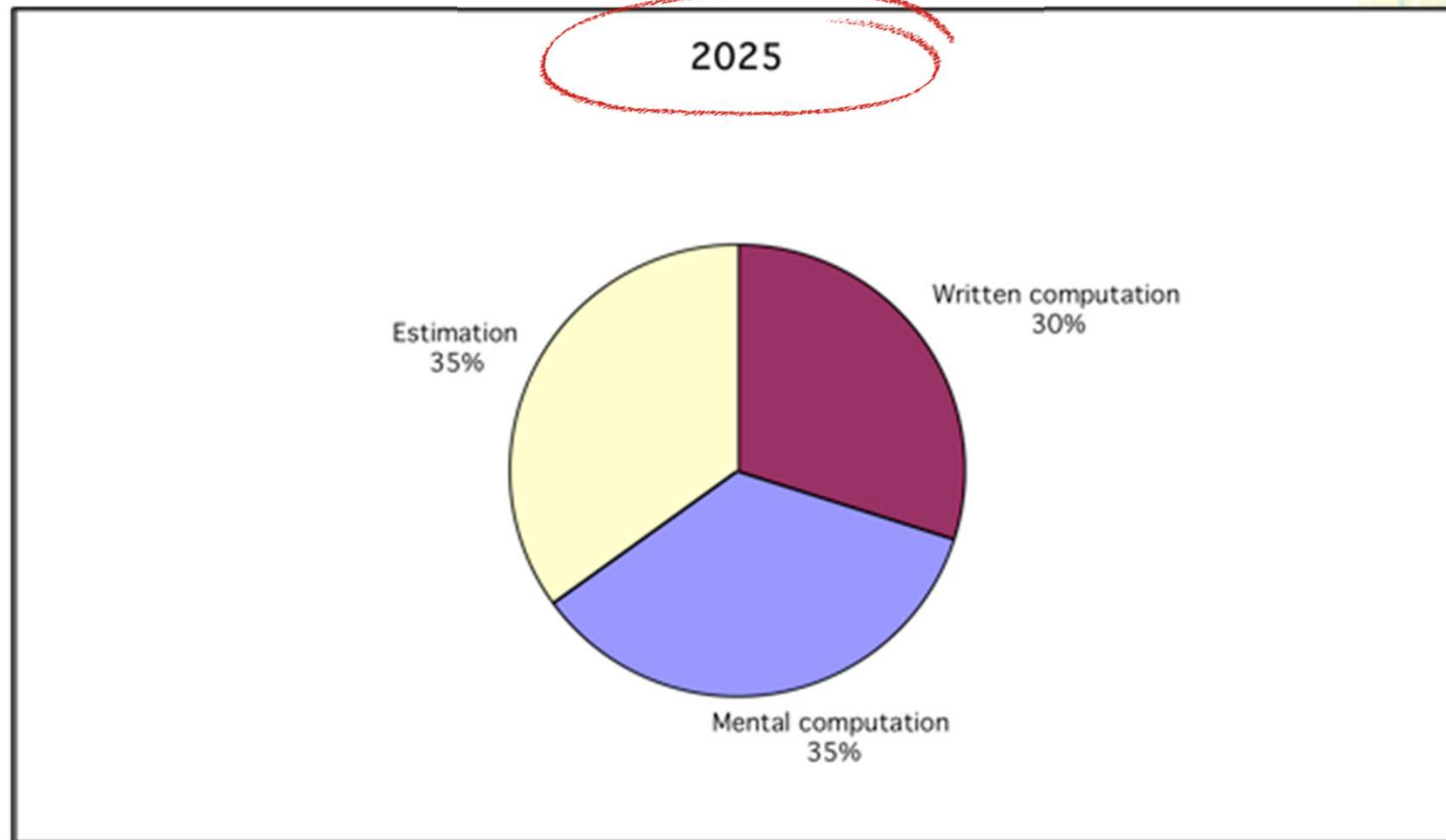


# Over/Under 10





# Textbooks and Instruction of Mental Math / Estimation



Reys, R.E., Lindquist, M., Lambdin, D., Smith, N. *Helping Children Learn Mathematics*. Hoboken, NJ: Wiley & Sons, 2007

Reasonable plays a role.

**It has to be taught,  
discussed, and featured  
frequently (if not daily).**



Big  
Idea  
#2

**The algorithm isn't  
the end goal.**

**Big  
Idea  
#3**

$$\begin{array}{r} 99 \\ + 3 \\ \hline 102 \end{array}$$

## Routine: “That One”



For which problems would you use a standard algorithm?

---

A.  $0.25 \times 48$

D.  $1.09 \times 42.4$

B.  $9 \times 12.2$

E.  $8.5 \times 0.2$

C.  $3.7 \times 4.1$

F.  $4.5 \times 2$

## Routine: “That One”

Which problems would you use a standard algorithm?

---

$99 + 14$

$47 + 47$

$23 + 67$

$439 + 440$

$57 + 117$

$78 - 64$

$67 - 43$

$933 - 750$

$302 - 199$

$617 - 438$

## Routine: “That one”

Which problems would you solve **in your head**?

---

$9 + 4$

$8 - 5$

$7 + 7$

$60 - 43$

$9 + 19$

$93 - 75$

$4 + 1.0$

$30 - 19$

$5 + 7 + 5$

$61 - 04$

## Routine: “That one”

Which problems would you solve **in your head**?

---

$$-9 + 4$$

$$-8 - 5$$

$$-7 + -7$$

$$6.0 - -4.3$$

$$-9 + -19$$

$$-9.3 - 7.5$$

$$4 + -1.0$$

$$3.0 - 1.9$$

$$5 + 7 + 5$$

$$6.1 - 0.4$$



## Routine: “That One”

---

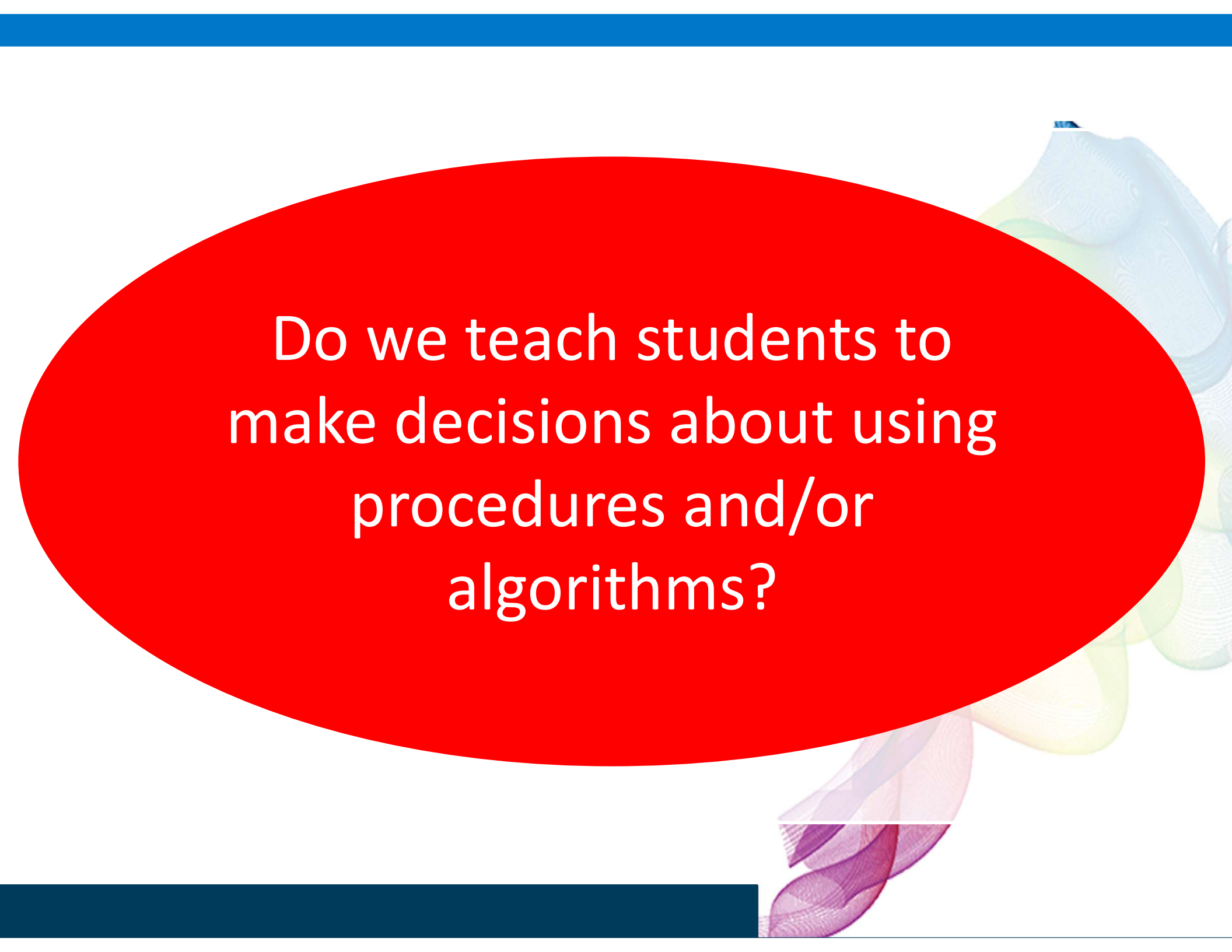
- Provide a list of expressions.
- Have students determine which one(s) they would solve with a standard algorithm **(or certain strategy)** and which they wouldn't use an algorithm for.

$$99 + 14$$

$$47 + 47$$

$$23 + 67$$

$$439 + 440$$

The background of the slide features a large, solid red oval in the center. To the right of the oval, there are faint, overlapping images of various banknotes in blue, green, and purple. A solid dark blue horizontal bar is located at the bottom of the slide.

Do we teach students to  
make decisions about using  
procedures and/or  
algorithms?

The algorithm isn't the end goal.

**In fact, using it is often the opposite of being fluent.**



Big  
Idea  
#3

# What ISN'T a strategy:

Base ten blocks\*

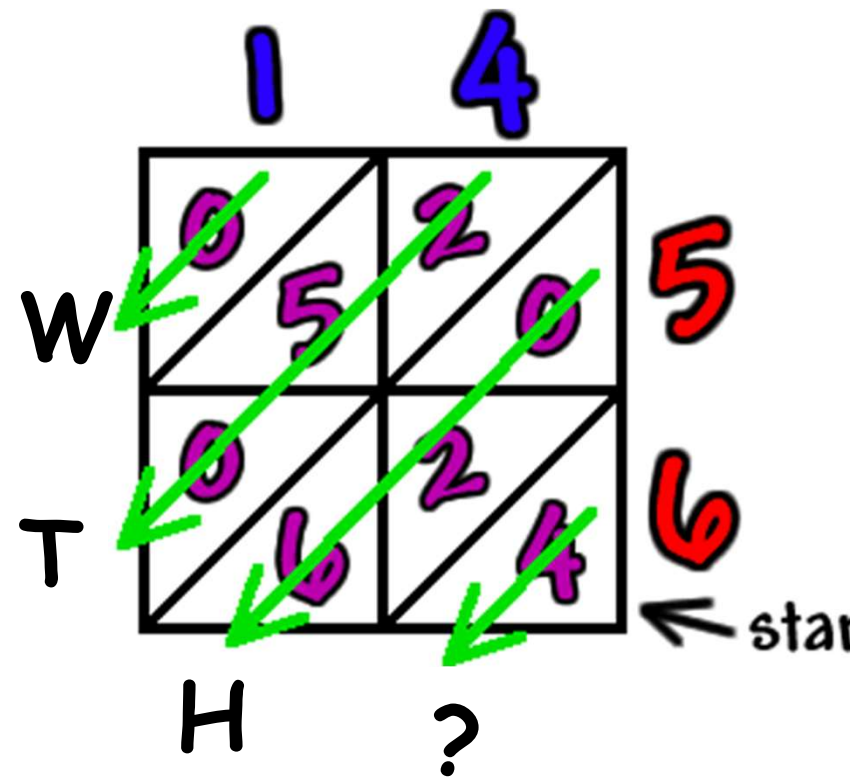
Number lines

Drawings / diagrams

Lattice

Touch math

Algorithms



**Strategies are for each  
and every student.**

**Big  
Idea  
#4**

What  
fundamental  
understandin  
g must you  
have?

Did you use  
an  
algorithm  
for each  
(any)?

Why move  
between  
strategies?

Why didn't  
you use  
someone  
else's  
strategy?

### Subtracting Whole Numbers

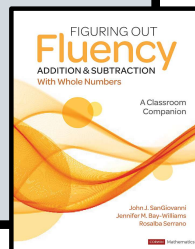
1.  $25 - 19 =$

2.  $81 - 13 =$

3.  $404 - 385 =$

4.  $198 - 179 =$

5.  $610 - 125 =$



### Solving Missing Value Proportions

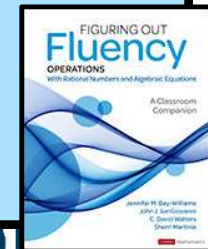
1.  $\frac{15}{30} = \frac{n}{46}$

2.  $\frac{12}{15} = \frac{48}{n}$

3.  $\frac{30}{n} = \frac{6}{24}$

4.  $\frac{3.5}{5} = \frac{14}{n}$

5.  $\frac{n}{15} = \frac{7}{9}$



# Strategies are for each and every student.

They'll just get confused.

They don't need all of these strategies.

Isn't the right answer all that matters?

Pictures are fine at this age.

There are too many strategies.

Isn't the point to learn the standard algorithm?

# One way isn't best.

- Numbers change.
- Situations change.
- Everyone thinks differently.
- Strategies are the result of sense making.



$$\begin{array}{r} 49 + 27 \\ \hline 76 \end{array}$$

$$\begin{array}{l} 49 + 27 = 76 \\ 50 + 26 = 76 \end{array}$$

$$\begin{array}{l} 40 + 20 = 60 \\ 9 + 7 = 16 \\ 76 \end{array}$$



Strategies are for each  
and every student.

**Avoiding or withholding  
strategy instruction has  
serious consequences.**



# Big Idea #4

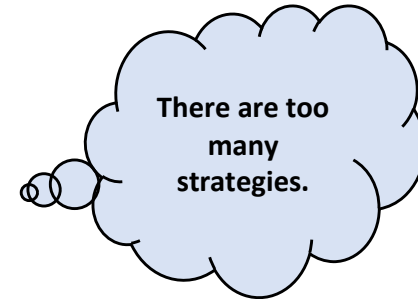
I have to get  
them ready  
for middle  
school

**There are significant  
strategies.**

**Big  
Idea  
#5**

The slide features a white background with a solid blue horizontal bar at the top and a matching blue bar at the bottom. On the right side, there is a large, dark blue circle with a black outline. Inside this circle, the text "Big Idea #5" is written in a white, bold, sans-serif font. To the right of the circle, there is a colorful, abstract, wavy shape in shades of blue, green, and yellow. The text "There are significant strategies." is positioned on the left side of the slide in a bold, black, sans-serif font.

# There are FIVE strategies for addition and subtraction.

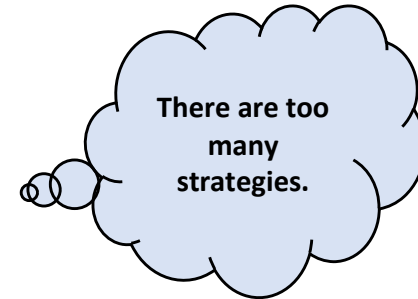


1. Count On (+), Count Back (–)
2. Make Ten
3. Use Partial
4. Compensation
5. Think Addition (Count Up)

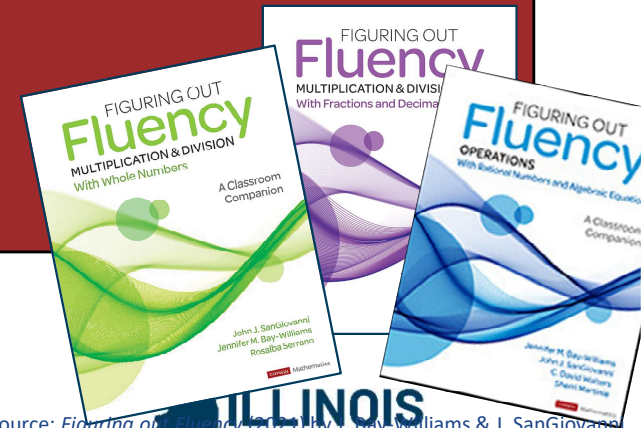


Source: Figuring out Fluency (2021) by J. Bay-Williams & J. SanGiovanni

# There are FIVE strategies for multiplication and division.



1. Break Apart (including Partial Products)
2. Halve and Double
3. Compensation
4. Partial Quotients
5. Think Multiplication



Source: *Figuring out Fluency* (2021) by J. Bay-Williams & J. SanGiovanni

# Comparing Fractions

## Tools/Representations

Number  
Lines

Fraction  
Circles

Equations

Cuisenaire  
Rods

Fraction  
Strips

Drawings

## Strategies

Using  
Benchmarks

Common  
Numerators

Distance

Common  
Denominators

Source: *Figuring out Fluency* (2021) by J. Bay-Williams & J. SanGiovanni

# What ISN'T a strategy:

Base ten blocks\*

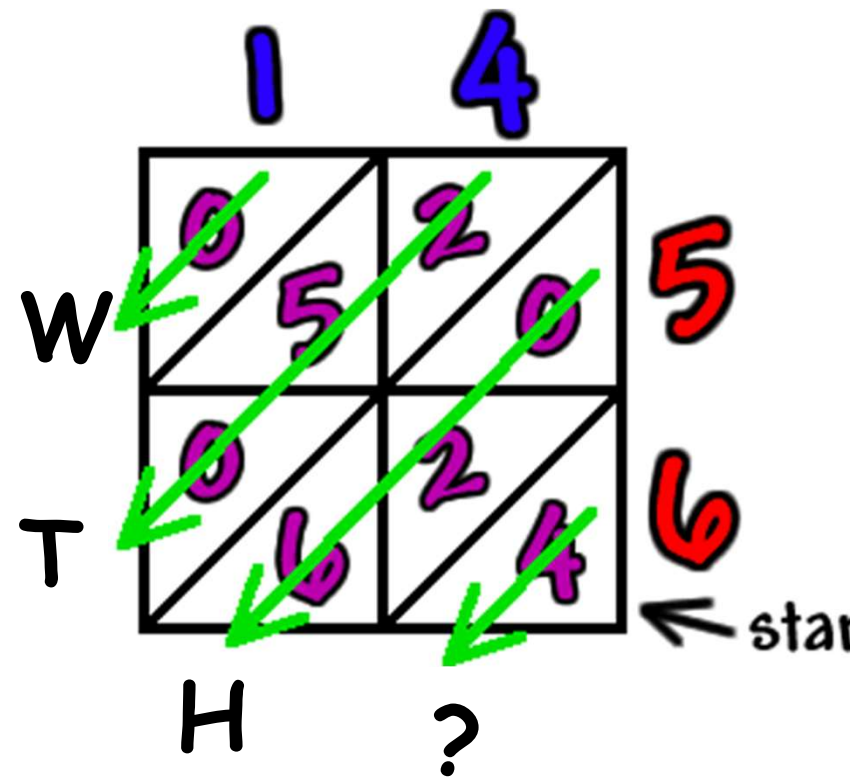
Number lines

Drawings / diagrams

Lattice

Touch math

Algorithms



There are significant strategies.

**Not everything is a strategy. There are 7 strategies in total and 5 for each operation set.**



Big  
Idea  
#5

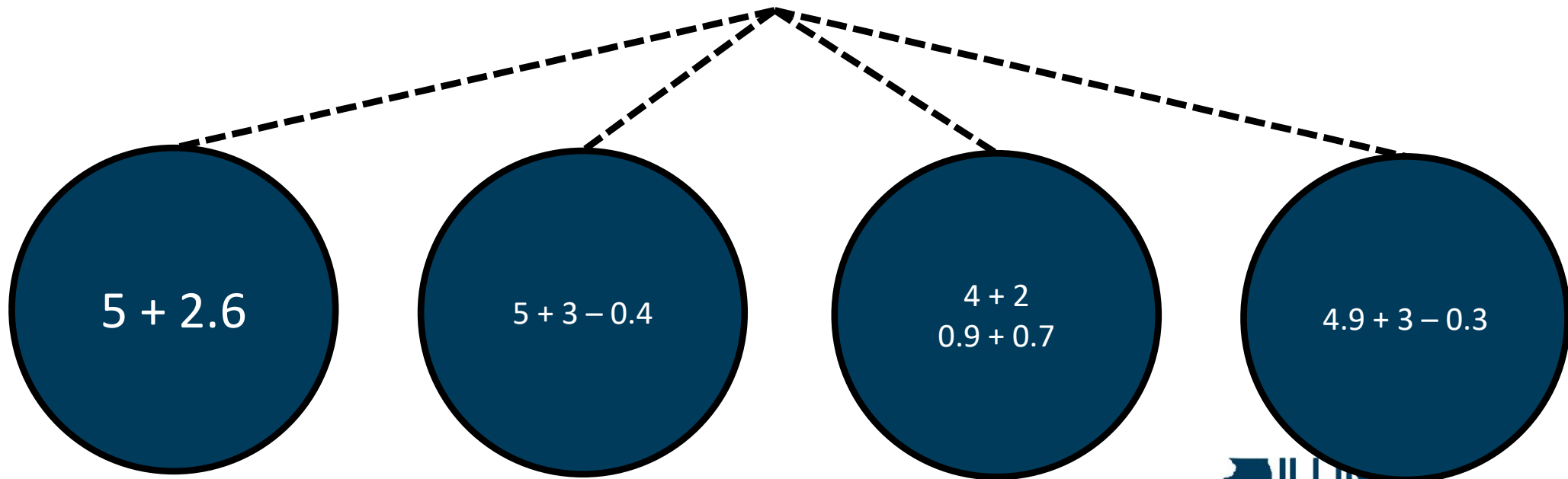
**Strategies “grow up.”**

**Big  
Idea  
#6**

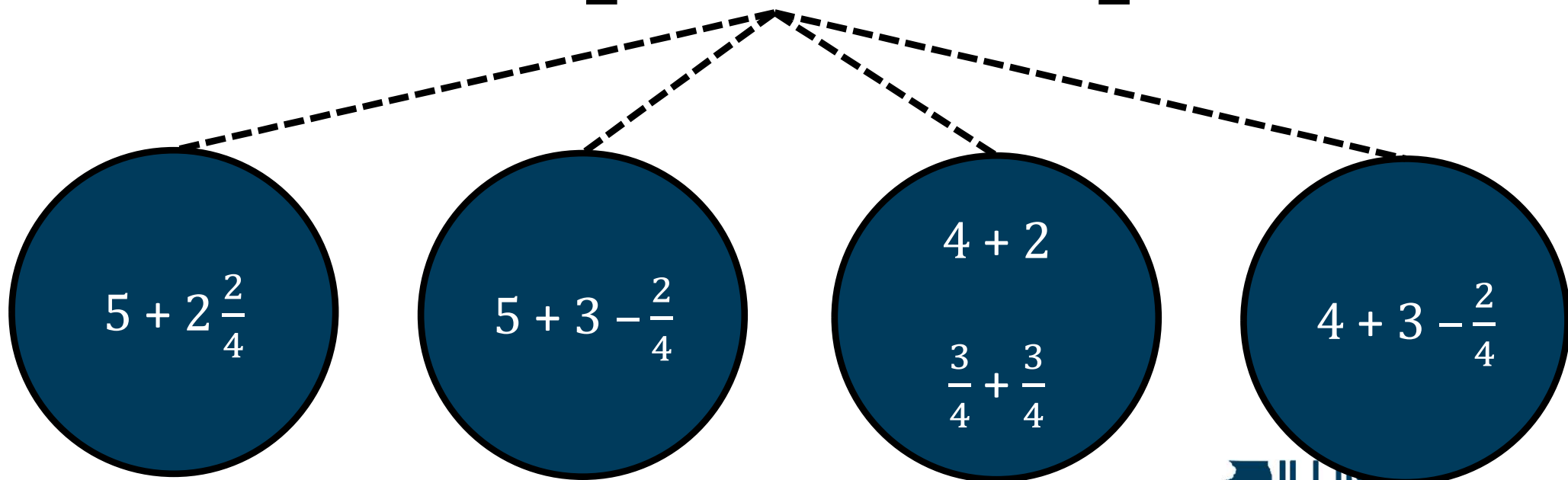
The slide features a white background with a solid blue horizontal bar at the top and a matching blue bar at the bottom. On the right side, there is a large, dark blue circle with a black outline. Inside this circle, the text "Big Idea #6" is written in a white, bold, sans-serif font. To the right of the circle, there are several overlapping, semi-transparent, colorful shapes in shades of blue, green, and purple, resembling stylized waves or abstract patterns. The text "Strategies “grow up.”" is positioned on the left side of the slide in a bold, black, sans-serif font.



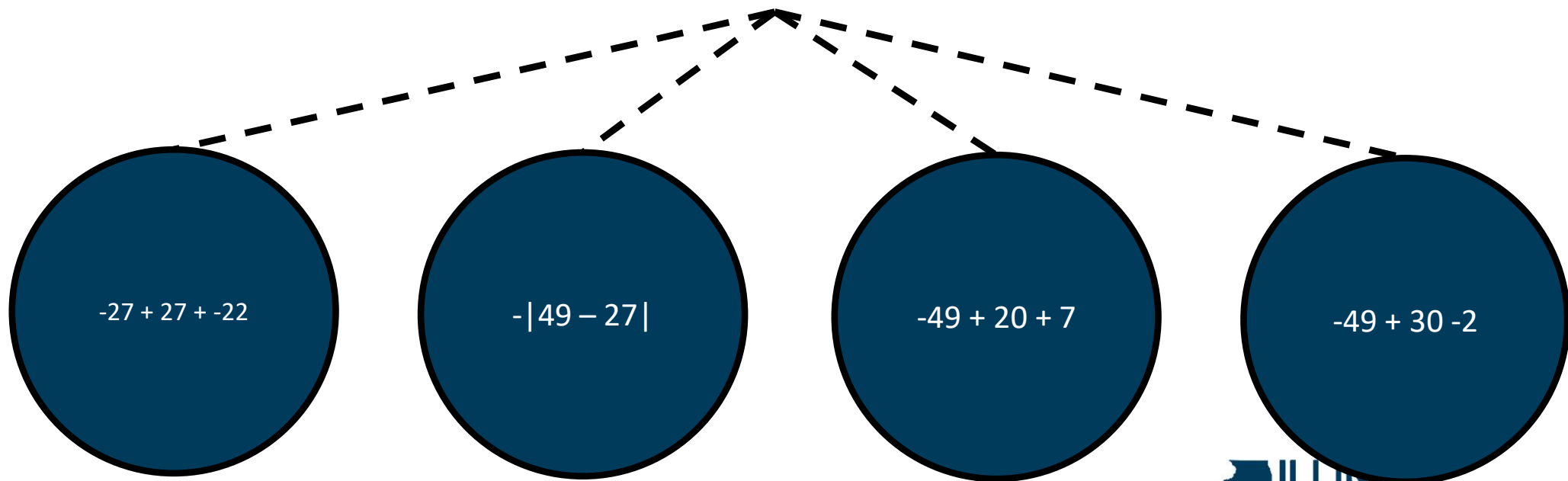
# $4.9 + 2.7$



$$4\frac{3}{4} + 2\frac{3}{4}$$



# $-49 + 27$



BREAK APART  
(PARTIAL PRODUCTS)

$$25 \times 16$$

	10	6
20	200	120
5	50	30

$$20 \times 10 = 200$$

$$20 \times 6 = 120$$

$$5 \times 10 = 50$$

$$5 \times 6 = 30$$

$$200 + 120 + 50 + 30 = 400$$

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

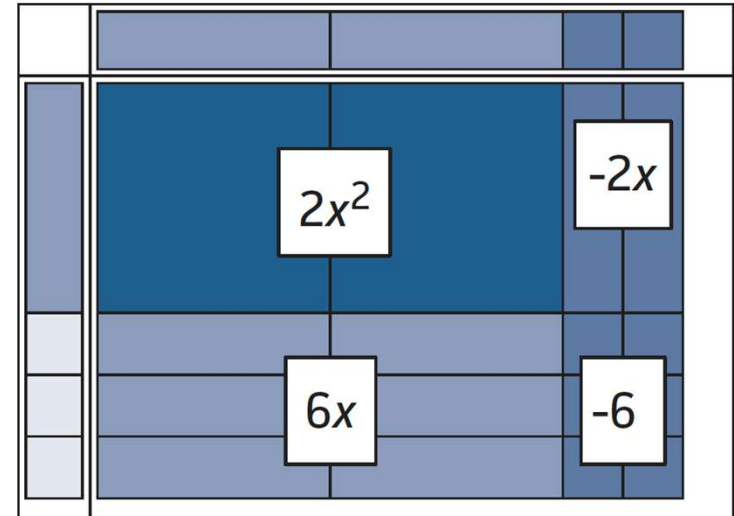


FIGURE 4.3 • Algebra Tiles Illustrate Multiplying Polynomials, an Example of Partial Products

Strategies “grow up.”

**Fluency flourishes when  
it begins in elementary  
school and matures in  
middle school.**

**Big  
Idea  
#6**

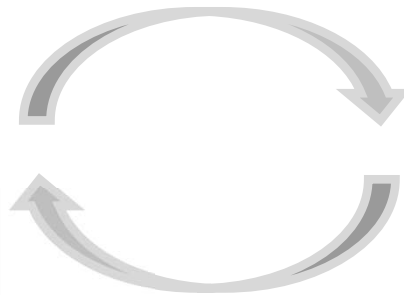
**Take time to teach,  
practice, and assess  
fluency well.**

**Big  
Idea  
#7**

# Teach the Strategy

(Acquisition)

- Understand how it works
- Represent it
- Determine if it always works
- Identify when it works best
- Focus on it (only)



# Practice the Strategy

- Practice how it works, when to use it
- Keep practice brief and consistent
- Connect and reflect on practice
- This takes time.

Routines

Games

Centers

Independent Practice

# Assess the Strategy

- Can they use it?
- Do they know when to use it?
- Are they efficient with it?
- Identify challenges with **acquisition vs repetition.**



## ACTIVITY 1.4 TWO CUTS

### Teaching Partial Products

Centimeter grid paper is a useful tool for representing multiplication with two-digit factors. In this activity, each student is given a rectangle with the same dimensions. In this example, students have rectangles that are 24 by 24. They are tasked with making two cuts so that they create four smaller rectangles. They could use these rectangles to represent the partial products of a multiplication problem.

Does it matter how we break apart factors?

Is it better to break apart factors in certain ways?

$10 \times 9$ 90	$14 \times 9$ 126
$10 \times 18$ 180	$14 \times 18$ 252

$12 \times 14$ 168	$12 \times 14$ 168
$12 \times 13$ 156	$12 \times 13$ 156

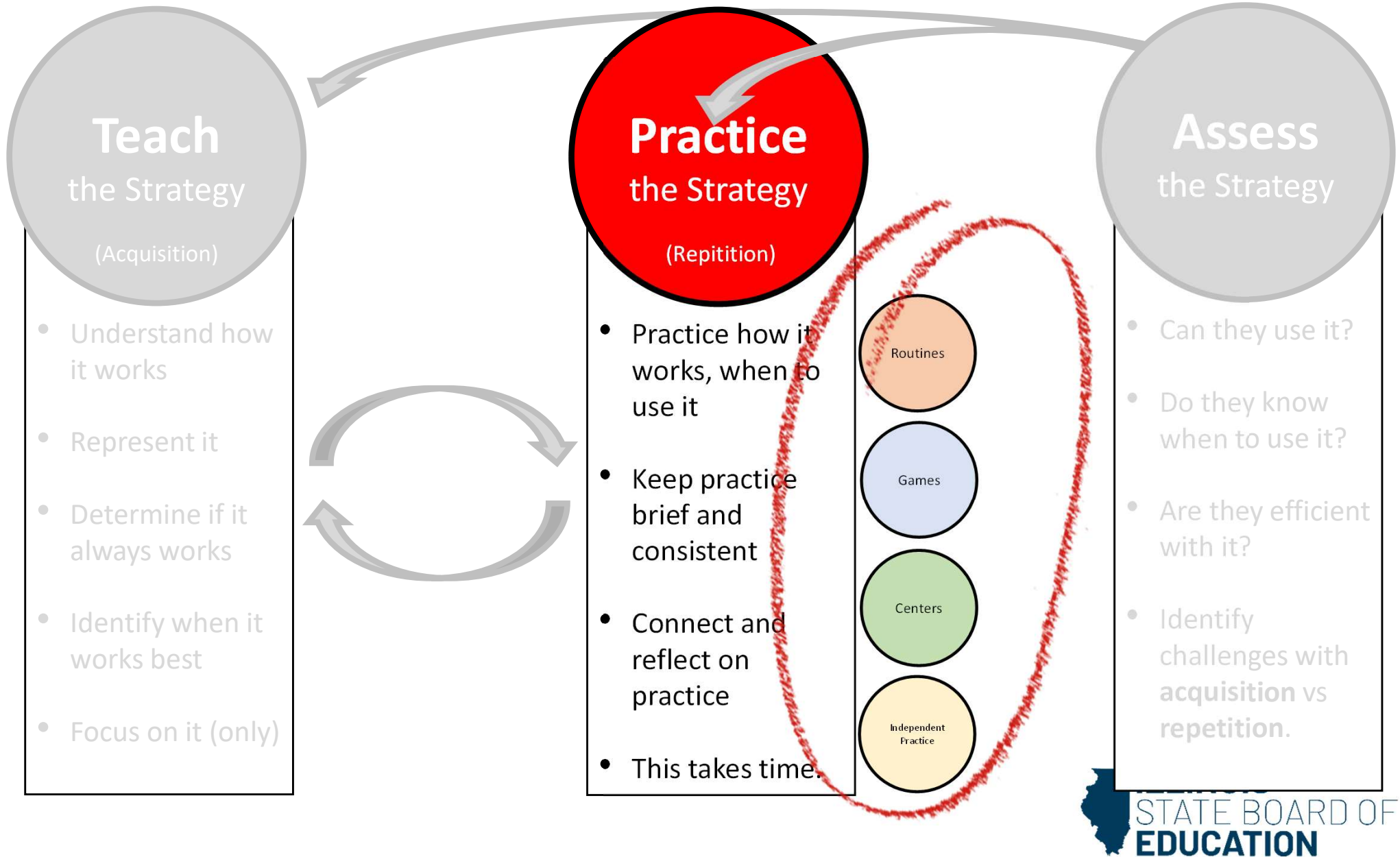
$7 \times 8$ 56	$17 \times 8$ 136
$7 \times 19$ 133	$17 \times 19$ 323

Does it always work?

Can we break factors into more parts?

SanGiovanni, et al (2022)







Score: \_\_\_\_\_

Date: \_\_\_\_\_



See how many of the following addition problems you can solve in 3 minutes.

$\begin{array}{r} 523 \\ +416 \\ \hline \end{array}$	$\begin{array}{r} 380 \\ +214 \\ \hline \end{array}$	$\begin{array}{r} 129 \\ +730 \\ \hline \end{array}$	$\begin{array}{r} 650 \\ + 37 \\ \hline \end{array}$	$\begin{array}{r} 918 \\ +251 \\ \hline \end{array}$	$\begin{array}{r} 362 \\ +536 \\ \hline \end{array}$
$\begin{array}{r} 627 \\ +352 \\ \hline \end{array}$	$\begin{array}{r} 440 \\ + 59 \\ \hline \end{array}$	$\begin{array}{r} 145 \\ +544 \\ \hline \end{array}$	$\begin{array}{r} 703 \\ +184 \\ \hline \end{array}$	$\begin{array}{r} 629 \\ +340 \\ \hline \end{array}$	$\begin{array}{r} 900 \\ + 27 \\ \hline \end{array}$
$\begin{array}{r} 348 \\ +111 \\ \hline \end{array}$	$\begin{array}{r} 752 \\ +237 \\ \hline \end{array}$	$\begin{array}{r} 456 \\ +220 \\ \hline \end{array}$	$\begin{array}{r} 663 \\ +315 \\ \hline \end{array}$	$\begin{array}{r} 747 \\ +132 \\ \hline \end{array}$	$\begin{array}{r} 573 \\ +426 \\ \hline \end{array}$
$\begin{array}{r} 331 \\ +548 \\ \hline \end{array}$	$\begin{array}{r} 602 \\ +374 \\ \hline \end{array}$	$\begin{array}{r} 228 \\ +630 \\ \hline \end{array}$	$\begin{array}{r} 183 \\ +616 \\ \hline \end{array}$	$\begin{array}{r} 704 \\ +134 \\ \hline \end{array}$	$\begin{array}{r} 560 \\ +428 \\ \hline \end{array}$
$\begin{array}{r} 175 \\ +417 \\ \hline \end{array}$	$\begin{array}{r} 329 \\ +551 \\ \hline \end{array}$	$\begin{array}{r} 768 \\ +123 \\ \hline \end{array}$	$\begin{array}{r} 447 \\ + 34 \\ \hline \end{array}$	$\begin{array}{r} 646 \\ +345 \\ \hline \end{array}$	$\begin{array}{r} 539 \\ +202 \\ \hline \end{array}$
$\begin{array}{r} 375 \\ +308 \\ \hline \end{array}$	$\begin{array}{r} 924 \\ + 49 \\ \hline \end{array}$	$\begin{array}{r} 683 \\ +117 \\ \hline \end{array}$	$\begin{array}{r} 586 \\ +206 \\ \hline \end{array}$	$\begin{array}{r} 405 \\ +266 \\ \hline \end{array}$	$\begin{array}{r} 736 \\ +248 \\ \hline \end{array}$
$\begin{array}{r} 167 \\ +253 \\ \hline \end{array}$	$\begin{array}{r} 573 \\ +159 \\ \hline \end{array}$	$\begin{array}{r} 849 \\ + 73 \\ \hline \end{array}$	$\begin{array}{r} 392 \\ +428 \\ \hline \end{array}$	$\begin{array}{r} 743 \\ +168 \\ \hline \end{array}$	$\begin{array}{r} 667 \\ + 35 \\ \hline \end{array}$
$\begin{array}{r} 423 \\ +789 \\ \hline \end{array}$	$\begin{array}{r} 390 \\ +745 \\ \hline \end{array}$	$\begin{array}{r} 274 \\ +839 \\ \hline \end{array}$	$\begin{array}{r} 355 \\ + 48 \\ \hline \end{array}$	$\begin{array}{r} 639 \\ +169 \\ \hline \end{array}$	$\begin{array}{r} 524 \\ +677 \\ \hline \end{array}$

## Unintended Goal of 40 Problems

- Diminished flexibility and reflective thought
- Weakened number sense and reasoning
- Misperception about what it means to do math





Score: \_\_\_\_\_

Date: \_\_\_\_\_

See how many of the following addition problems you can solve in 3 minutes.

$$\begin{array}{r} 523 \\ +416 \\ \hline \end{array}$$

$$\begin{array}{r} 380 \\ +214 \\ \hline \end{array}$$

$$\begin{array}{r} 129 \\ +730 \\ \hline \end{array}$$

$$\begin{array}{r} 650 \\ +37 \\ \hline \end{array}$$

$$\begin{array}{r} 918 \\ +251 \\ \hline \end{array}$$

$$\begin{array}{r} 362 \\ +536 \\ \hline \end{array}$$

$$\begin{array}{r} 627 \\ +352 \\ \hline \end{array}$$

$$\begin{array}{r} 440 \\ +59 \\ \hline \end{array}$$

$$\begin{array}{r} 145 \\ +544 \\ \hline \end{array}$$

$$\begin{array}{r} 703 \\ +184 \\ \hline \end{array}$$

$$\begin{array}{r} 629 \\ +340 \\ \hline \end{array}$$

$$\begin{array}{r} 900 \\ +27 \\ \hline \end{array}$$

$$\begin{array}{r} 348 \\ +111 \\ \hline \end{array}$$

$$\begin{array}{r} 752 \\ +237 \\ \hline \end{array}$$

$$\begin{array}{r} 456 \\ +220 \\ \hline \end{array}$$

$$\begin{array}{r} 663 \\ +315 \\ \hline \end{array}$$

$$\begin{array}{r} 747 \\ +132 \\ \hline \end{array}$$

$$\begin{array}{r} 573 \\ +426 \\ \hline \end{array}$$

$$\begin{array}{r} 331 \\ +548 \\ \hline \end{array}$$

$$\begin{array}{r} 602 \\ +374 \\ \hline \end{array}$$

$$\begin{array}{r} 228 \\ +630 \\ \hline \end{array}$$

$$\begin{array}{r} 183 \\ +616 \\ \hline \end{array}$$

$$\begin{array}{r} 704 \\ +134 \\ \hline \end{array}$$

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$$\begin{array}{r} 175 \\ +417 \\ \hline \end{array}$$

$$\begin{array}{r} 329 \\ +551 \\ \hline \end{array}$$

$$\begin{array}{r} 768 \\ +123 \\ \hline \end{array}$$

$$\begin{array}{r} 447 \\ +34 \\ \hline \end{array}$$

$$\begin{array}{r} 646 \\ +345 \\ \hline \end{array}$$

$$\begin{array}{r} 539 \\ +202 \\ \hline \end{array}$$

$$\begin{array}{r} 375 \\ +308 \\ \hline \end{array}$$

$$\begin{array}{r} 924 \\ +49 \\ \hline \end{array}$$

$$\begin{array}{r} 683 \\ +117 \\ \hline \end{array}$$

$$\begin{array}{r} 586 \\ +206 \\ \hline \end{array}$$

$$\begin{array}{r} 405 \\ +266 \\ \hline \end{array}$$

$$\begin{array}{r} 736 \\ +248 \\ \hline \end{array}$$

$$\begin{array}{r} 167 \\ +253 \\ \hline \end{array}$$

$$\begin{array}{r} 573 \\ +159 \\ \hline \end{array}$$

$$\begin{array}{r} 849 \\ +73 \\ \hline \end{array}$$

$$\begin{array}{r} 392 \\ +428 \\ \hline \end{array}$$

$$\begin{array}{r} 743 \\ +168 \\ \hline \end{array}$$

$$\begin{array}{r} 667 \\ +35 \\ \hline \end{array}$$

$$\begin{array}{r} 423 \\ +789 \\ \hline \end{array}$$

$$\begin{array}{r} 390 \\ +745 \\ \hline \end{array}$$

$$\begin{array}{r} 274 \\ +839 \\ \hline \end{array}$$

$$\begin{array}{r} 355 \\ +48 \\ \hline \end{array}$$

$$\begin{array}{r} 639 \\ +169 \\ \hline \end{array}$$

$$\begin{array}{r} 524 \\ +677 \\ \hline \end{array}$$

But what if...





Score: \_\_\_\_\_

Date: \_\_\_\_\_



See how many of the following addition problems you can solve in 3 minutes.

$$\begin{array}{r} 523 \\ +416 \\ \hline \end{array}$$

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$$\begin{array}{r} 524 \\ +677 \\ \hline \end{array}$$

## But what if...

Circle the problems that would be good to solve with compensation (efficiency).

# "Say It As a Make Tens"

## Say It As a Make Tens

$$38 + 56$$

$$19 + 64$$

$$71 + 48$$

1. Pose a few problems.
2. Have students think about how to say it as make tens.
3. Students share with a partner.
4. The class discusses.

NOTE: Students aren't to share the sum ONLY how to restate it.

Practice  
(Routine)



*"Say It As a Make Tens<sup>?</sup> or hundreds*

## Say It As a Make Tens

A  $71 + 489$

B  $392 + 394$

C  $578 + 164$

1. Pose a few problems.
2. Have students think about how to say it as make tens.
3. Students share with a partner.
4. The class discusses.

NOTE: Students aren't to share the sum ONLY how to restate it.

Practice  
(Routine)

"Say It As a Make <sup>a Whole</sup> Tens?"

Say It As a Make Tens

$$13.8 + 5.6$$

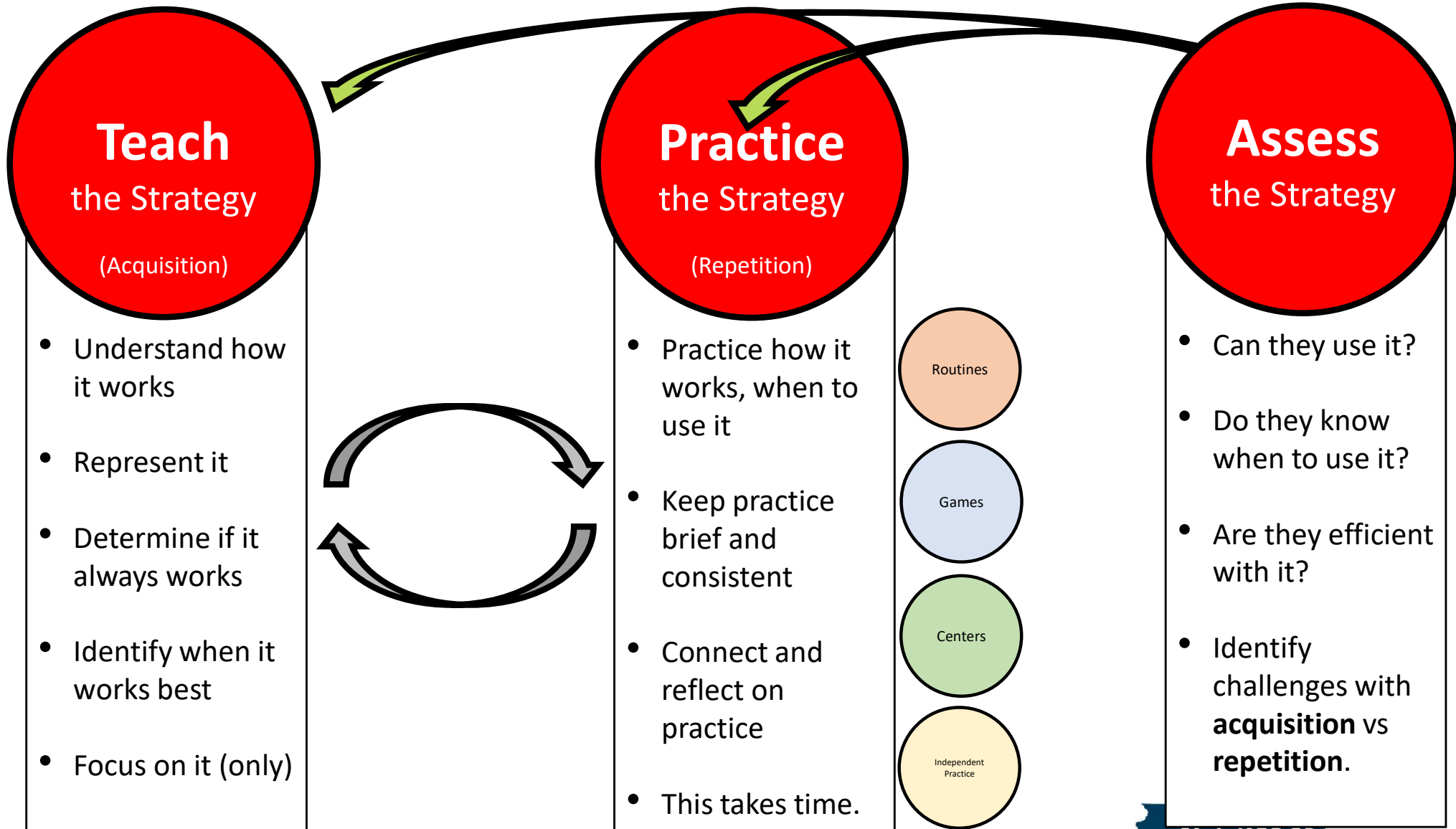
$$21.9 + 6.4$$

$$7.1 + 48.9$$

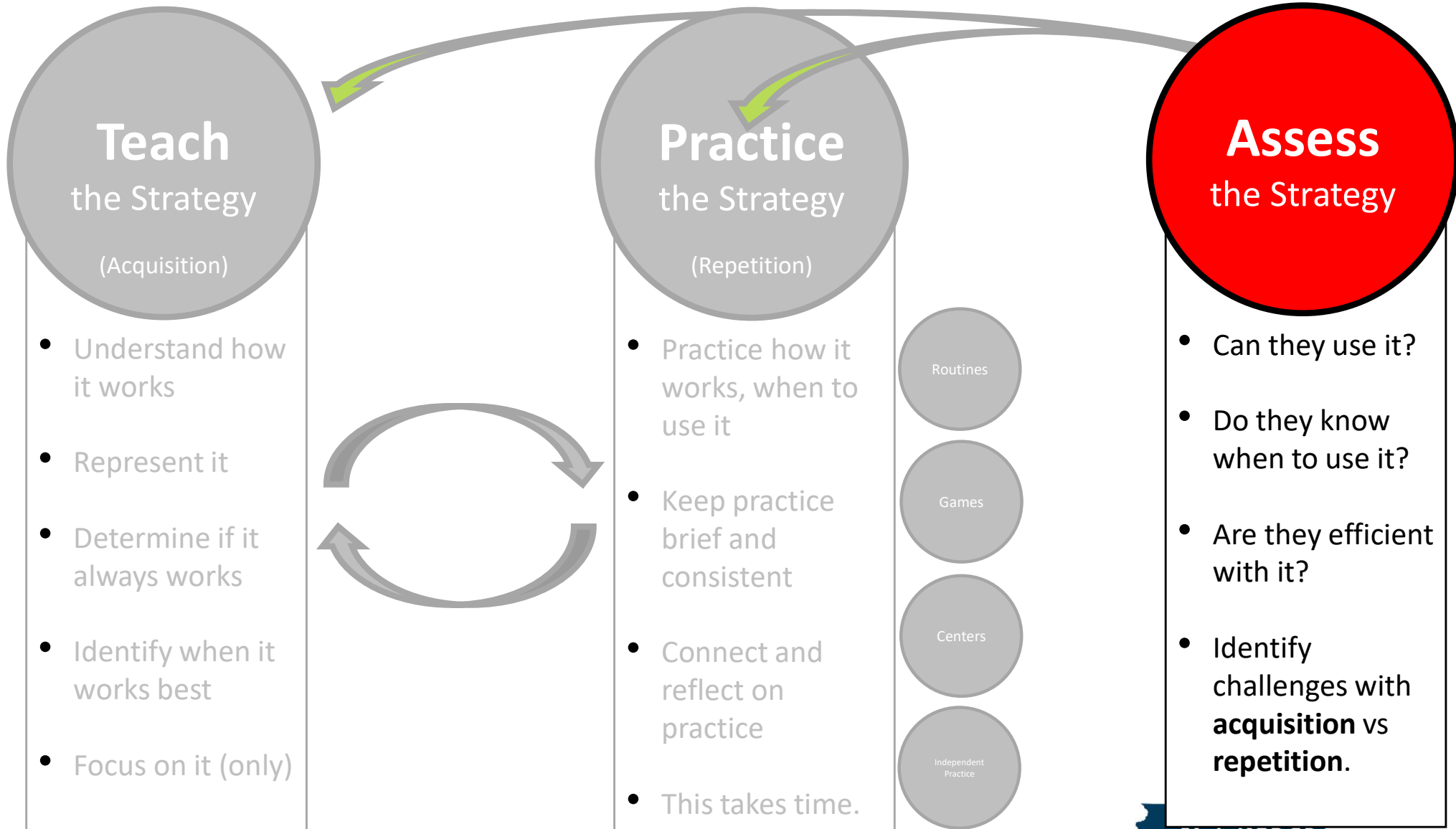
1. Pose a few problems.
2. Have students think about how to say it as make **a whole**.
3. Students share with a partner.
4. The class discusses.

NOTE: Students aren't to share the sum ONLY how to restate it.

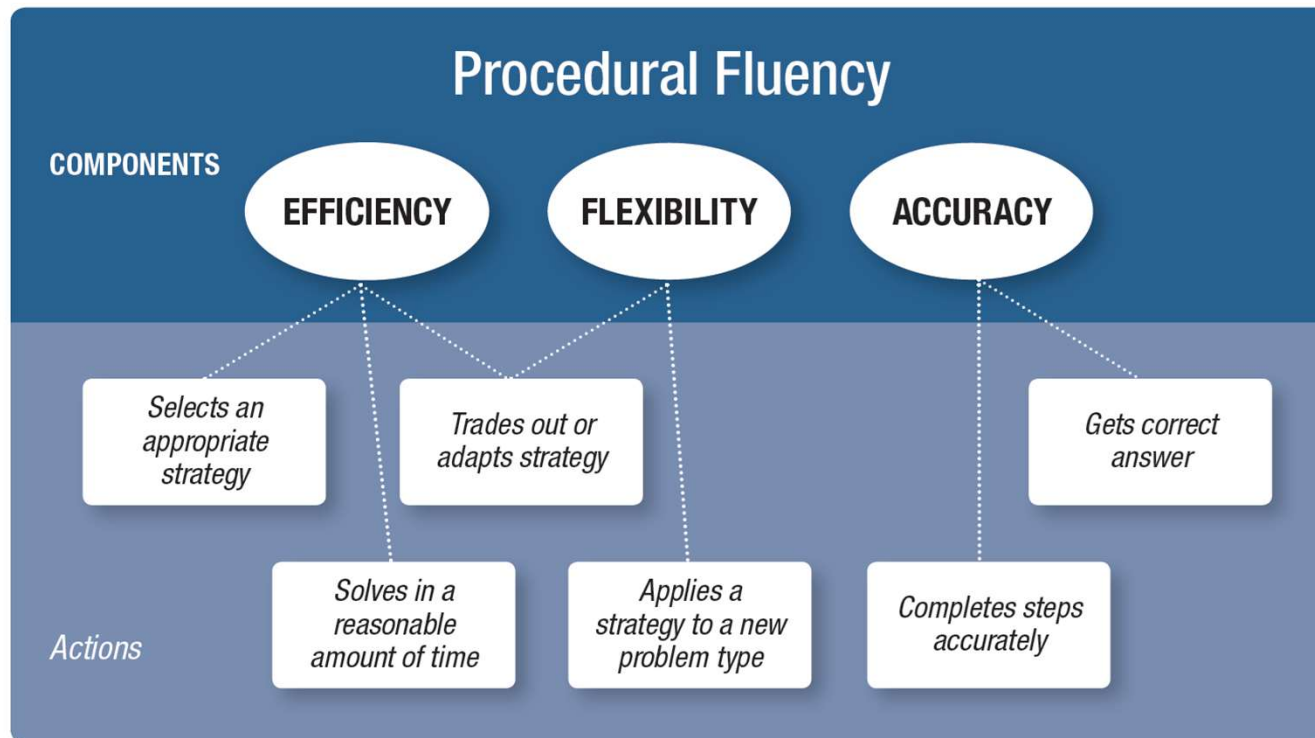






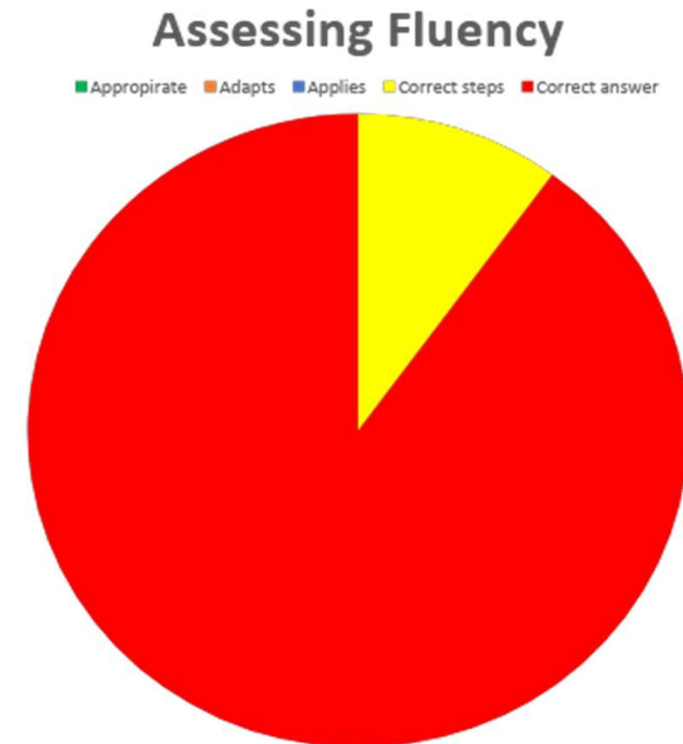
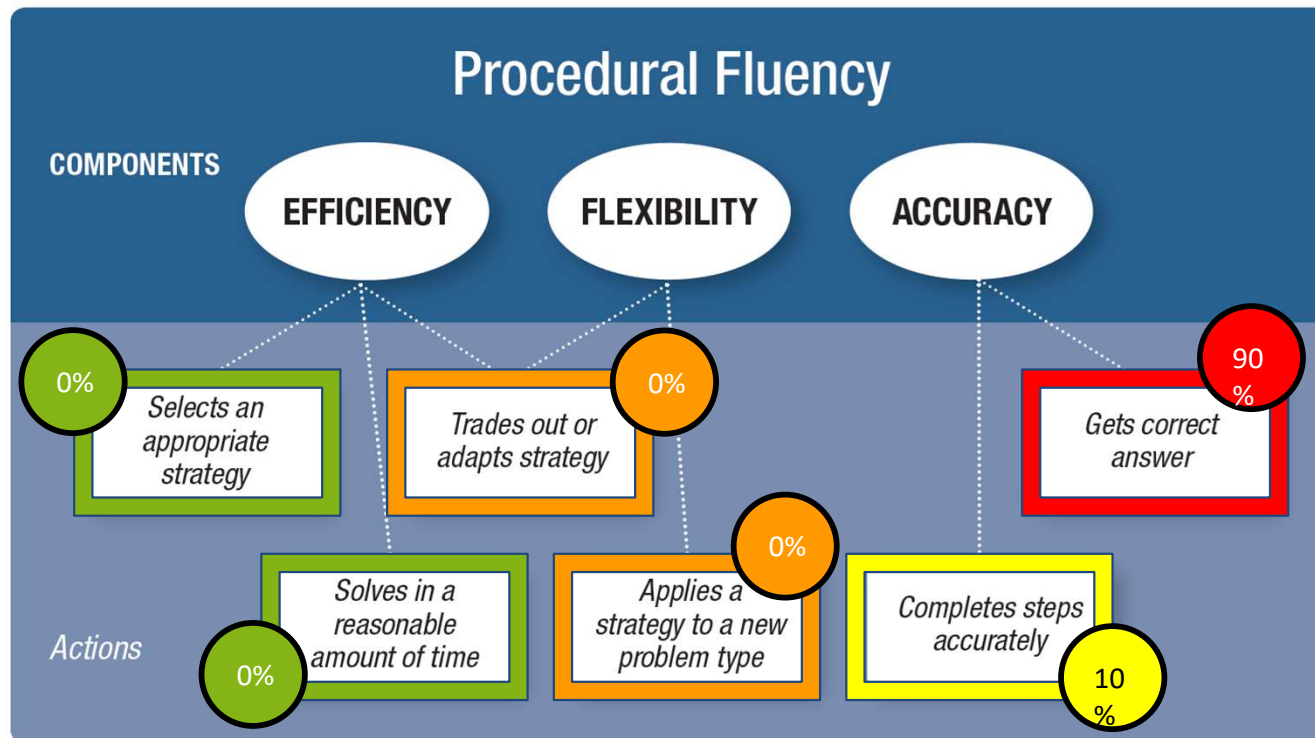


How often are the components of fluency assessed?



What percent of fluency assessment(s) measure each action?

# How often are the components of fluency assessed?



# Assessing through observation...

FLUENCY COMPONENT CHECKLIST				
Procedural Fluency Components	Evident?			Instructional Next Steps
1. Efficiency	Yes	No	Not Observed	
2. Flexibility	Yes	No	Not Observed	
3. Accuracy	Yes	No	Not Observed	

FLUENCY ACTIONS CHECKLIST				
Procedural Fluency Actions	Evident?			Comments
1. Selects an appropriate strategy	Yes	No	Not Observed	
2. Solves in a reasonable amount of time	Yes	No	Not Observed	
3. Trades out or adapts strategy	Yes	No	Not Observed	
4. Applies a strategy to a new problem type	Yes	No	Not Observed	
5. Completes steps accurately	Yes	No	Not Observed	
6. Gets correct answer	Yes	No	Not Observed	

*Figuring out Fluency (2021) by J. Bay-Williams & J. SanGiovanni*

REMOVE

Score: \_\_\_\_\_

Date: \_\_\_\_\_

See how many of the following addition problems you can solve in 3 minutes.

$\begin{array}{r} 523 \\ +416 \\ \hline \end{array}$	$\begin{array}{r} 380 \\ +214 \\ \hline \end{array}$	$\begin{array}{r} 129 \\ +730 \\ \hline \end{array}$	$\begin{array}{r} 650 \\ + 37 \\ \hline \end{array}$	$\begin{array}{r} 918 \\ +251 \\ \hline \end{array}$	$\begin{array}{r} 362 \\ +536 \\ \hline \end{array}$
$\begin{array}{r} 627 \\ +352 \\ \hline \end{array}$	$\begin{array}{r} 440 \\ + 59 \\ \hline \end{array}$	$\begin{array}{r} 145 \\ +544 \\ \hline \end{array}$	$\begin{array}{r} 703 \\ +184 \\ \hline \end{array}$	$\begin{array}{r} 629 \\ +340 \\ \hline \end{array}$	$\begin{array}{r} 900 \\ + 27 \\ \hline \end{array}$
$\begin{array}{r} 348 \\ +111 \\ \hline \end{array}$	$\begin{array}{r} 752 \\ +237 \\ \hline \end{array}$	$\begin{array}{r} 456 \\ +220 \\ \hline \end{array}$	$\begin{array}{r} 663 \\ +315 \\ \hline \end{array}$	$\begin{array}{r} 747 \\ +132 \\ \hline \end{array}$	$\begin{array}{r} 573 \\ +426 \\ \hline \end{array}$
$\begin{array}{r} 331 \\ +548 \\ \hline \end{array}$	$\begin{array}{r} 602 \\ +374 \\ \hline \end{array}$	$\begin{array}{r} 228 \\ +630 \\ \hline \end{array}$	$\begin{array}{r} 183 \\ +616 \\ \hline \end{array}$	$\begin{array}{r} 704 \\ +134 \\ \hline \end{array}$	$\begin{array}{r} 560 \\ +428 \\ \hline \end{array}$
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$\begin{array}{r} 423 \\ +789 \\ \hline \end{array}$	$\begin{array}{r} 390 \\ +745 \\ \hline \end{array}$	$\begin{array}{r} 274 \\ +839 \\ \hline \end{array}$	$\begin{array}{r} 355 \\ + 48 \\ \hline \end{array}$	$\begin{array}{r} 639 \\ +169 \\ \hline \end{array}$	$\begin{array}{r} 524 \\ +677 \\ \hline \end{array}$

## But what if...

Circle the problems that would be good to solve with compensation (**efficiency**).

Find three problems that would be good to solve with partial sums. Show how you would solve them.

Circle problems that you estimate to have a sum more than 1,000 (**reasonableness**).

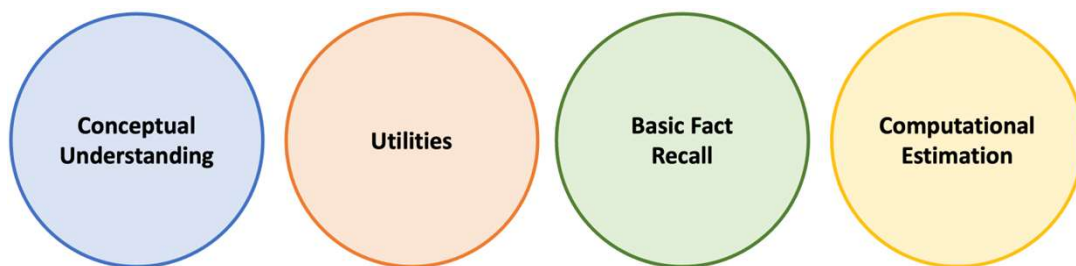
Circle 5 problems you can solve without an algorithm. Star 5 that you would solve with an algorithm.

Take time to teach,  
practice, and assess  
fluency well.

**We have work to do.**

Big  
Idea  
#7

**Fluency starts with good  
(and necessary)  
beginnings.**



$$49 + 27$$

What skills are  
needed for the  
different  
strategies?



**Fluency is built on these foundations and good beginnings.**

**CONCEPTUAL  
UNDERSTANDING**

Operations  
Properties  
Situations  
Representations

**BASIC  
FACTS**

Strategy-based  
Connections  
Extensions

**COMPUTATIONAL  
ESTIMATION**

Rounding  
Front-end  
Compatible  
Range

**Fluency is built on these foundations and good beginnings.**

**CONCEPTUAL  
UNDERSTANDING**

Operations  
Properties  
Situations  
Representations

**AUTOMATICITIES**

**BASIC FACTS**  
Strategy-based  
Connections  
Extensions

**UTILITIES**

Distance to 10  
Number Relationships  
Decomposition  
Skip-Counting

**COMPUTATIONAL  
ESTIMATION**

Rounding  
Front-end  
Compatible  
Range

## Other utilities that can become automaticities

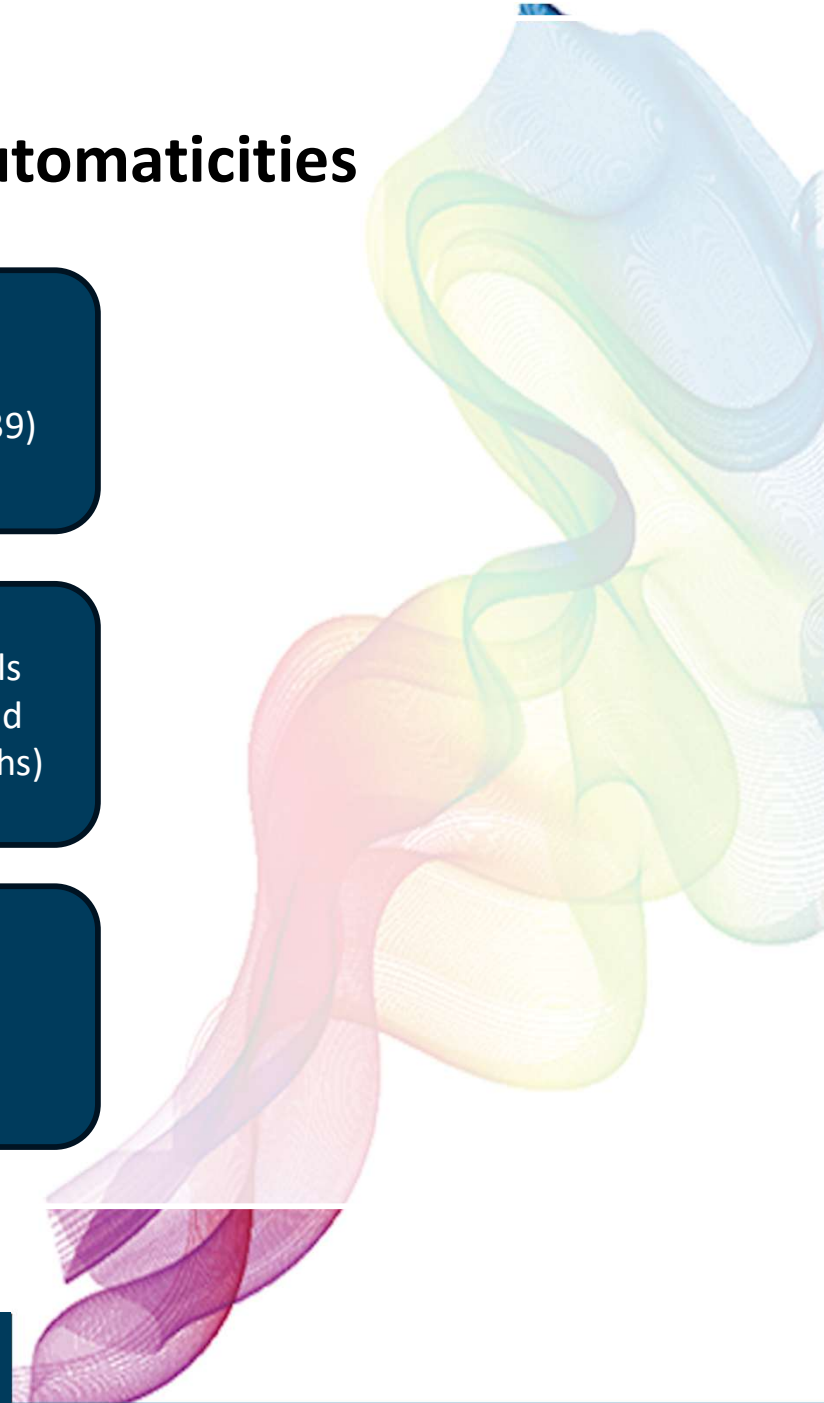
Inverse Relationships  
(e.g.,  $\times \frac{1}{4}$  is the same as  $\div 4$ )

Doubling or Halving  
(e.g., half of 56, doubling 2.39)

Moving between form  
(e.g., 0.25, 25%, and  $\frac{1}{4}$ )

Doing and Undoing Decimals  
(e.g., change 2.39 to 239 and then move back to hundredths)

Manipulating “Popular” Numbers  
(e.g., 3, 4, 6, 8, 12, 24, 36, 48, 60, etc)



# Make It, Take It

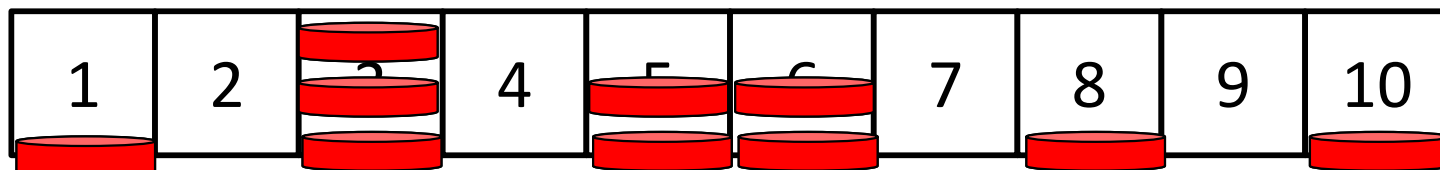


1	2	3	4	5	6	7	8	9	10
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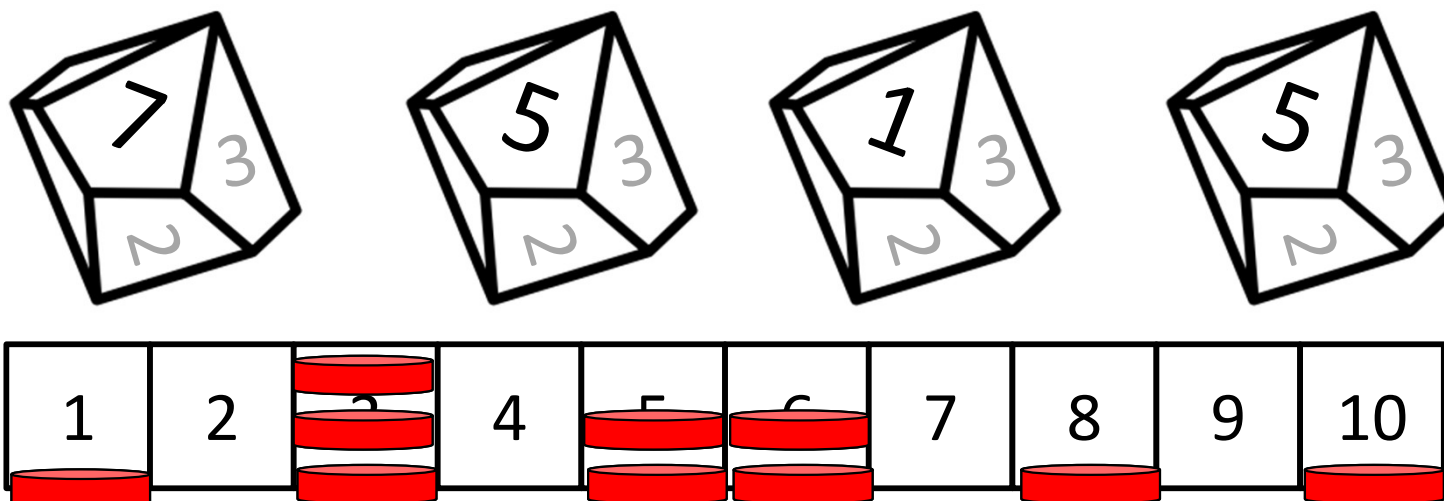
# Make It, Take It

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

# Make It, Take It



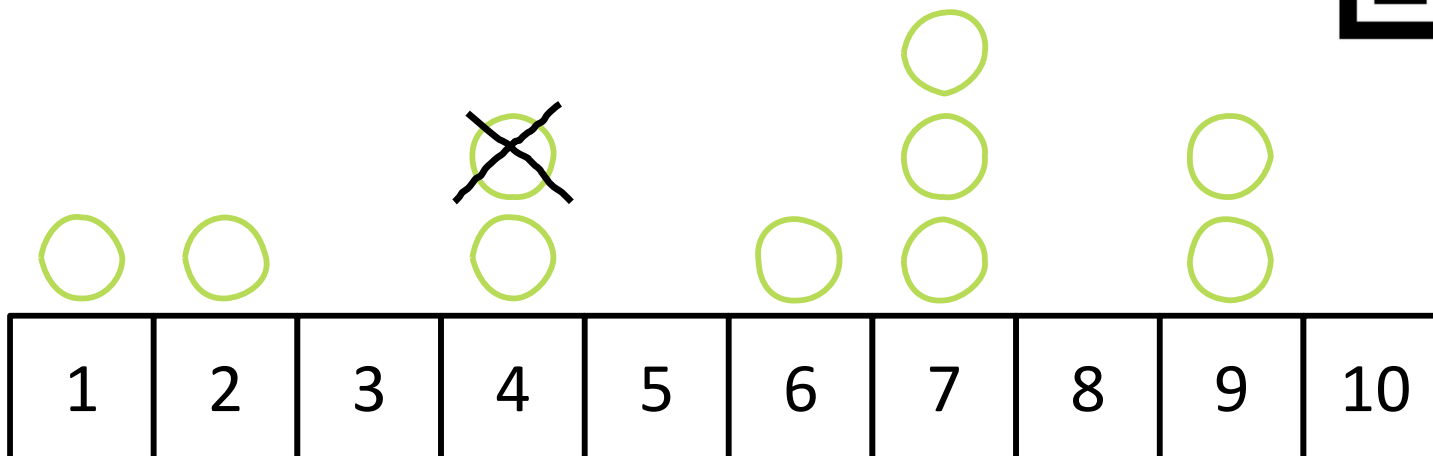
# Make It, Take It



# Make It, Take It



[www.bit.ly/48niPVi](http://www.bit.ly/48niPVi)



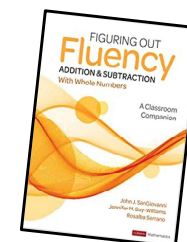


# Make It, Take It (20)

11	12	13	14	15	16	17	18	19	20
----	----	----	----	----	----	----	----	----	----

## Make It, Take It (30)

21	22	23	24	25	26	27	28	29	30
----	----	----	----	----	----	----	----	----	----

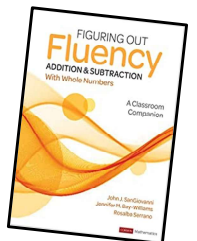


# Make It, Take It (40)

31	32	33	34	35	36	37	38	39	40
----	----	----	----	----	----	----	----	----	----

# Make It, Take It (470)

46	46	46	46	46	46	46	46	46	47
1	2	3	4	5	6	7	8	9	0



# Make It, Take It (50)

41	42	43	44	45	46	47	48	49	50
----	----	----	----	----	----	----	----	----	----

## Make It, Take It (5.0)

4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

$$49 + 27$$

$$4.9 + 2.7$$

Make It, Take It (50)

41	42	43	44	45	46	47	48	49	50
----	----	----	----	----	----	----	----	----	----

Make It, Take It (5.0)

4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Fluency starts with good  
(and necessary)  
beginnings.

**These are often the  
overlooked root causes  
for student challenges  
with strategy execution.**



Big  
Idea  
#8

**Fluency is a major issue  
of equity and access.**

**THE  
BIG  
IDEA**

# FLUENCY IS AN EQUITY ISSUE

## MATHEMATICAL IDENTITY

A **deeply held belief** students hold about themselves as mathematicians.

Aguirre, Mayfield-Ingram, & Martin, 2013



## MATHEMATICAL IDENTITY and FLUENCY

Understanding how strategies work and when they work **shapes confidence and competence** inherent in a positive student identity.

Bay-Williams & SanGiovanni, 2021

# FLUENCY IS AN EQUITY ISSUE

## MATHEMATICAL AGENCY

Being able to **participate and perform** effectively in math.  
(Agency is identity in action.).

Aguirre, Mayfield-Ingram, & Martin, 2013



## MATHEMATICAL AGENCY and FLUENCY

Arming students with a deep understanding of different strategies and **empowering them to choose** a strategy for the problem at hand nurtures their agency.

Bay-Williams & SanGiovanni, 2021



## Barrier: Mindset

**Strategies are for each and every student.**

There are too many strategies.

Isn't the right answer all that matters?

They'll just get confused.

They don't need all of these strategies.

Isn't the point to learn the standard algorithm?

Pictures are fine at this age.

## Barrier: Adults

**Strategies are for each and every student.**

Why isn't it just right or wrong anymore?

Why doesn't speed matter anymore?

Why isn't math like what we learned?

I just don't get this new math.

Why does everyone need to learn math?

Why is math taught differently today?

# Barrier: Structures

**Strategies are for each and every student.**

**Where is this  
in our  
curriculum?**

**What do I do for  
intervention?**

**Why isn't this  
working?**

**This is for  
enrichment.**

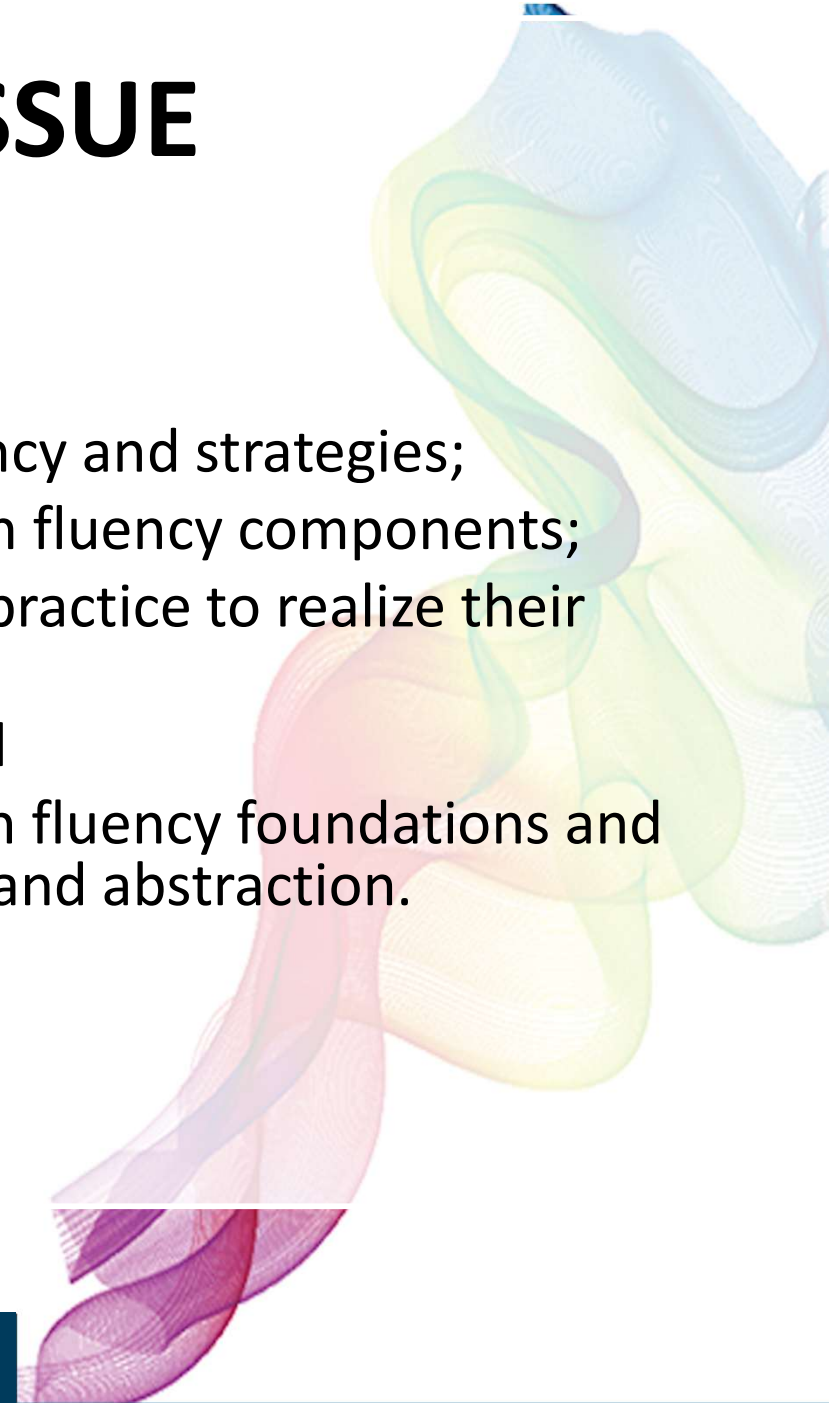
**Why don't we  
have more time?**

**How do you  
do this?**

# FLUENCY IS AN **EQUITY** ISSUE

Each and every student must have access to

- A teacher with deep understanding of fluency and strategies;
- High-quality instructional materials for each fluency components;
- A reasonable amount of time to learn and practice to realize their fluency;
- Responsible and complete assessment; and
- Intervention, when needed, that focuses on fluency foundations and strategy instruction rather than procedure and abstraction.



**What ideas about  
fluency resonate?**

**What does this  
mean for our  
numeracy work?**



# Numeracy from Fluency

John SanGiovanni

[john@sangiomath.com](mailto:john@sangiomath.com)

[✕ @JohnSanGiovanni](https://twitter.com/JohnSanGiovanni)



# Needs Assessment Survey Summary & Table Talk

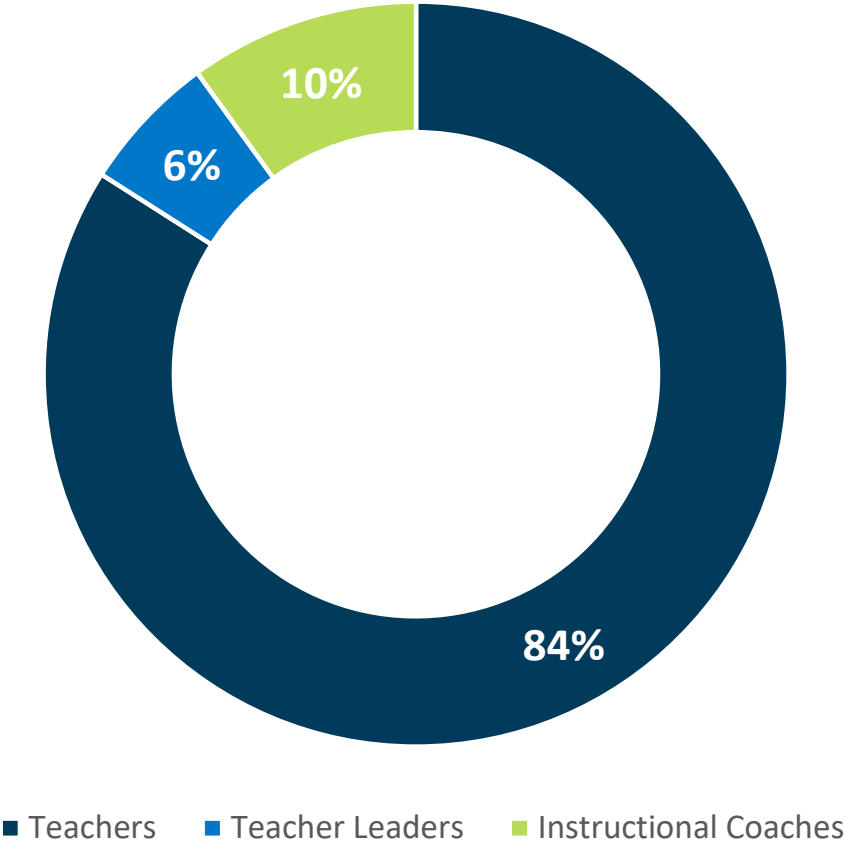
# Context

The Illinois State Board of Education (ISBE) conducted a Needs Assessment Survey from April 16th-May 9th on mathematics instruction to inform the development of the Illinois Comprehensive Numeracy Plan (ICNP).

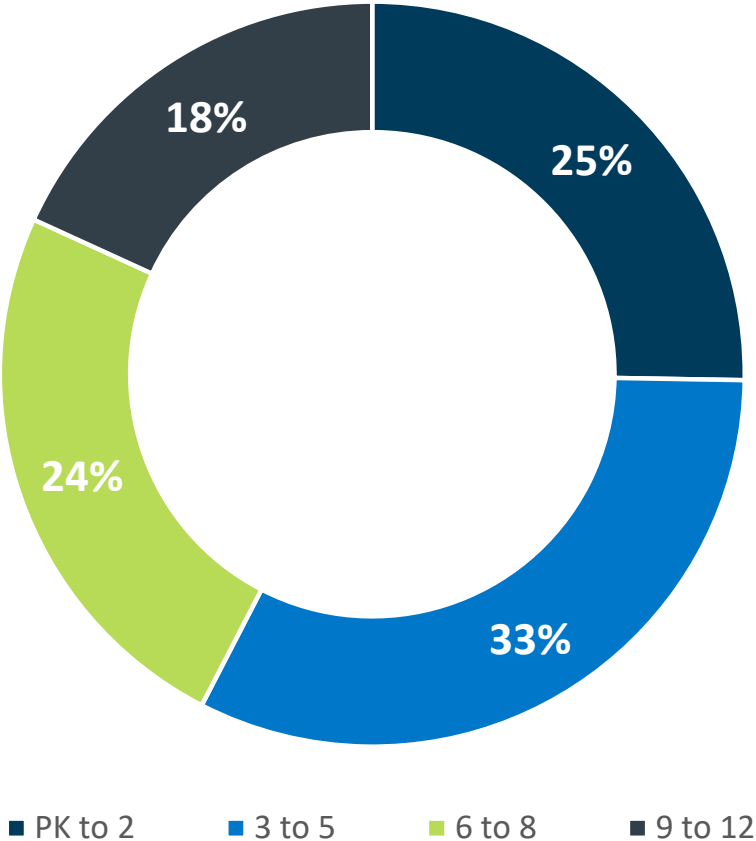


# Survey Responses-Survey 1

Survey 1 Respondents

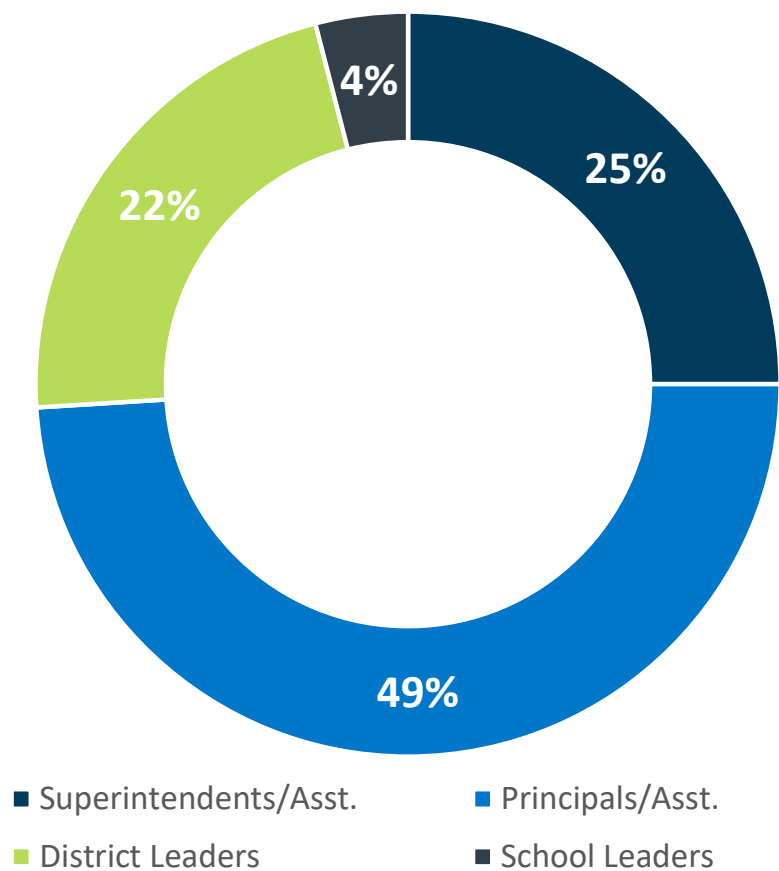


Grade Levels

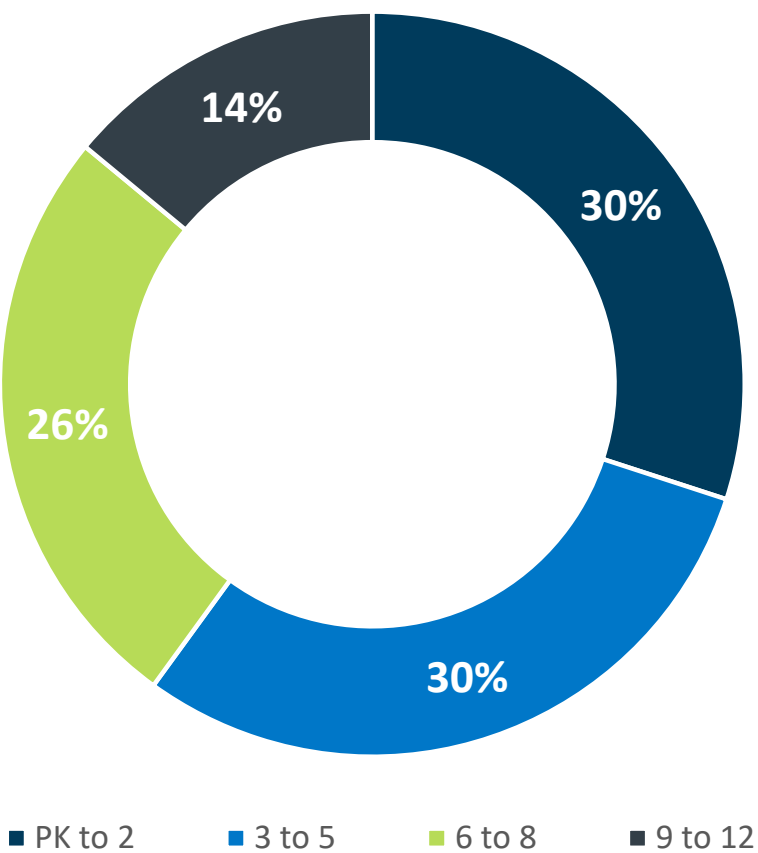


# Survey Responses-Survey 2

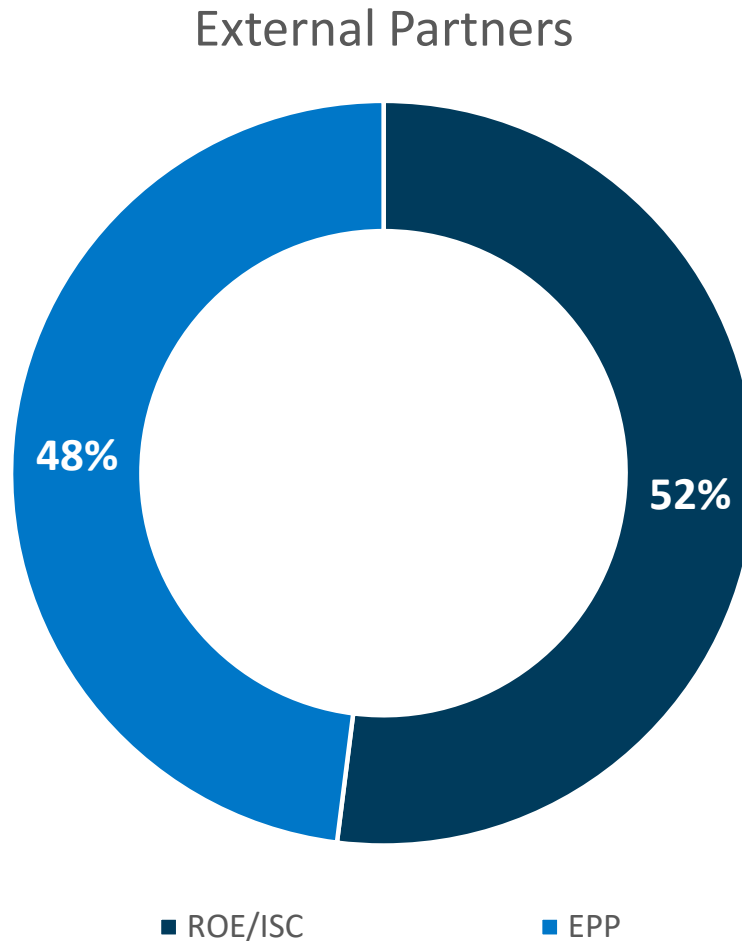
District Leaders



Grade Levels



# Survey Responses-Survey 3



# Overarching Themes from Survey Responses

Professional Learning

Curriculum

Instructional Differentiation

Assessment

Parental Involvement

Educator Preparation

## Areas of Current Strengths Identified by Respondents

The necessary professional learning and support is received to deliver current math curriculum

Regular engagement in professional learning related to curriculum currently implemented

Support for students from underrepresented groups provided through targeted interventions, culturally relevant resources, and advanced math and enrichment opportunities



# Opportunities for Growth Identified by Respondents

## Curriculum Selection and Curriculum Effectiveness

Current curriculum selections are aligned to Illinois Learning Standards a high percentage of respondents are unsure of *how* and how often math curriculum is reviewed for effectiveness.

## Curriculum Resources

While students have access to a variety of curriculum resources, there are disparities in the **quality** of the instructional resources and a need for levels of support in curriculum flexibility to be adaptable to the needs of students.



## PK-12 Instructional Approaches

Overwhelmingly, the primary instructional approach used in Illinois classrooms is direct instruction; the least utilized method is mastery-based learning.

# Assessment

K-12 math local assessments are more favorable in understanding student learning.

## Student Dispositions

While some students generally enjoy mathematics, many more are less enthusiastic—due to mindset, self-confidence, and perceived ability.

## Parental Involvement

Collectively, respondents agree that parental involvement is a concern, indicating that a large percentage of parents are not very involved in their child's math education journey.

# Educator Preparation Programs

# Opportunities for Growth

## Perspectives from Institutes of Higher Education

### Teacher Candidate Readiness

Teacher candidates are minimally prepared for post-secondary math coursework, having gaps in conceptual understanding and foundational math skills.

*Note: Instructional strategies most frequently used to deliver instruction in math EPP courses is direct instruction.*

## The Most Significant Challenges

- Insufficient focus on math specific pedagogy
- Limited time within courses to deeply cover content
- Better alignment in math curricular vision between curriculum implemented in the student teaching field experience and math content in educator prep courses
- Partnerships between school districts and IHEs
- Preparation of faculty who teach methods courses from early childhood through secondary

# Table Talk Discussions



## Table Talk

### Discussion 1

As we develop the numeracy plan, what instructional shifts are most critical for advancing students' mathematical understanding, problem-solving, and real-world application?

What do **pre-service and in-service educators** need to know and be able to do to implement these shifts effectively across diverse learning contexts?

How can professional learning and support systems be aligned to build and sustain educator capacity for high-quality, responsive math instruction?

## Table Talk

### Discussion 2



How can professional learning be reimagined to better prepare all educators to meet the diverse academic, cultural, linguistic, and social-emotional needs of today's students?



What would it take to ensure that professional learning is equity-driven, ongoing, relevant, and aligned with curriculum, instruction, and assessment to improve student outcomes?

## Table Talk Discussion 3



The needs assessment survey indicates that district and school-level assessments currently play a significant role in shaping mathematics instructional decisions.



This finding raises an important question:

**How can we more strategically use assessment data—formative, summative, diagnostic, and standardized—to accelerate student learning and close achievement gaps?**



What specific ways can assessment-informed instruction be designed to better respond to students' needs and promote deeper, more rapid learning?

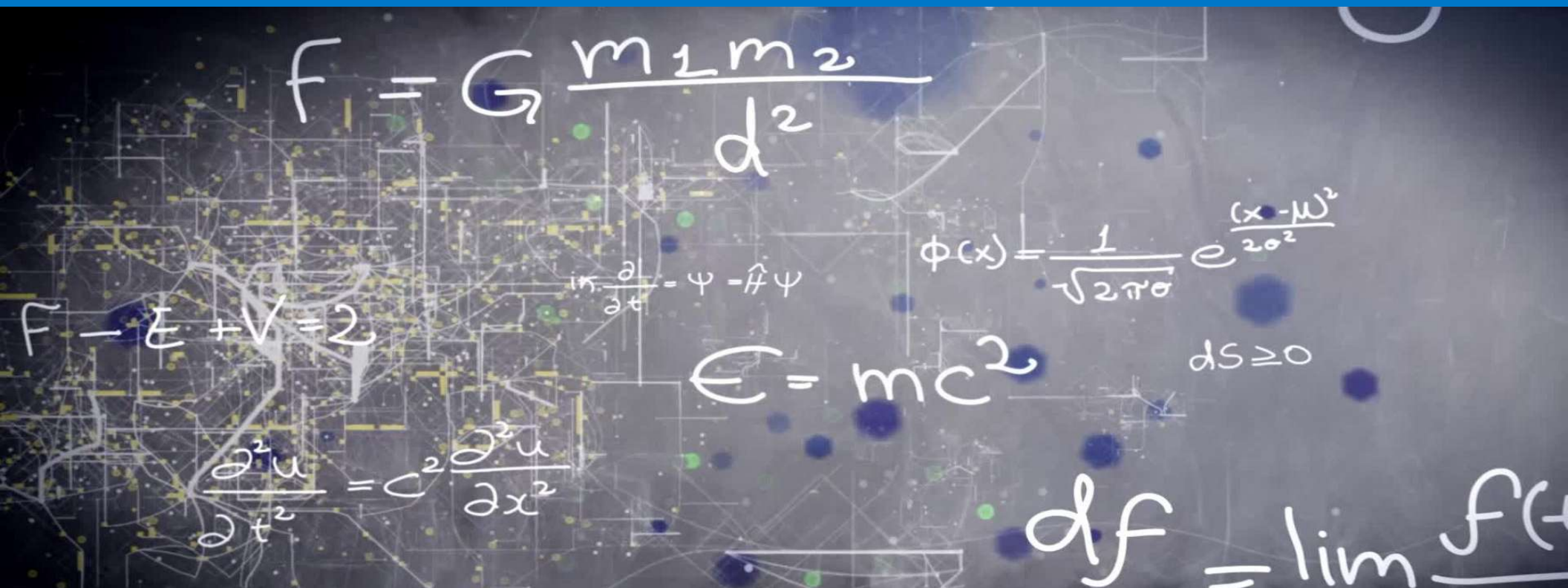


**Table Talk Discussion Protocol  
is on p.10 of your booklet.**

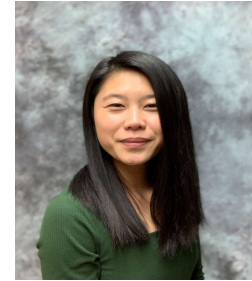
# Let's share out!







# The Big Picture of Mathematics Instruction



How should a comprehensive numeracy plan be designed to reflect a coherent and research-informed progression of mathematical understanding from early childhood through secondary education?

What systemic shifts in teacher preparation are necessary to equip future educators with the deep content knowledge and pedagogical agility required to advance equitable numeracy outcomes for all students?

How can educator preparation programs respond more intentionally to persistent opportunity gaps in mathematics achievement?



What priorities should be considered to ensure the numeracy plan is designed to reflect and respond to current research on the sociocultural dimensions of mathematics learning, particularly as it relates to identity, language, and access?

In what ways should educator preparation programs evolve to ensure that future teachers are equipped to recognize and build upon the diverse mathematical strengths that students bring to the classroom?

Survey findings indicate that teachers are seeking greater support in the areas of classroom technology integration, pedagogical content knowledge, and assessment practices.

Discuss some research-informed and promising practices for preparing teachers—both preservice and in-service—to deliver effective and equitable numeracy instruction? To what extent do these practices scale and adapt successfully in the context of ongoing professional learning for practicing educators?

# The State Lens on Numeracy: From Literacy to Numeracy



Craig Cullen



# From Literacy to Numeracy

Dr. Craig Cullen

Illinois Council of Teachers of Mathematics President  
Normal, IL

June 3, 2025

## **Illinois Council of Teachers of Mathematics**

- A community of PreK through Post-graduate (PreK–20) educators promoting equitable, high-quality mathematics teaching and learning through leadership, collaboration, advocacy and professional development.

# Illinois Council of Teachers of Mathematics

- Board of Volunteers
  - 5 Officers, 11 Directors
- Conferences
  - Annual ICTM Conference (Oct 4, 2025 at ISU)
  - Western ICTM Conference
  - Southern ICTM Conference
- Mathematics Contests
  - High School ICTM Contest
  - Grade School Contest
- Practitioner Journal
  - *Illinois Mathematics Teacher*

## **Illinois Council of Teachers of Mathematics**

- **Members Around the State**

Evanston High School has been working to detrack their classes

AP classes for all races has grown by over 300%

“Now, [all students are] going to be together instead of having one [honors] group of students be successful”

(Dale Leibforth, 2023 Lee Yunker Mathematics Leadership award winner)

# Illinois Council of Teachers of Mathematics

- Members Around the State  
Published articles in NCTM's  
*Mathematics Teacher: Learning  
and Teaching PK-12*

## Division Without Duress Yields High Levels of Success

Explore the impact technology has on mathematical identity and agency when students use mathematical action technology to engage in cycles of proof and support case-based reasoning.

Kristi J. Isaacson and Christina Betz-Cahill

## It's Off the Screen: Unearthing Megagons Through Technology

Mathematical action technology can foster equitable student discourse. Students engage in cycles of proof to create, test, and revise conjectures through dynamic exploration of the Pythagorean theorem.

Sean Nank, Jaclyn M. Murawska, and Steven J. Edgar



- # Background
- Motivated by the success of the Illinois State Board of Education's (2024) comprehensive literacy plan, today we are here to discuss a similar plan for numeracy
- 
- ILLINOIS  
STATE BOARD OF  
EDUCATION
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# Literacy Plan Vision and Purpose

- The Illinois State Board of Education believes literacy is an urgent priority necessary to **improve student achievement of lifelong literacy skills** for successful civic, educational, occupational, and personal engagement.
- The Illinois Comprehensive Literacy Plan acts as a roadmap **to enhance and unify core literacy instruction** efforts statewide.
- It is designed **to outline necessary supports and resources** for literacy reform, ensuring all students receive developmentally appropriate and evidence-based literacy instruction.

# Literacy Plan Goals

GOAL 1: Every student receives high-quality, evidence-based literacy instruction.

GOAL 2: Every educator is prepared and continuously supported to deliver high-quality, evidence-based literacy instruction.


GOAL 3: Every leader is equipped to create, maintain, and sustain equitable conditions for high-quality, evidence-based literacy instruction.

# Literacy Plan Rationale

- Linked to outcomes:
  - Income
  - Incarceration
  - Assistance Reliance
  - Health
  - Lifelong Success



## What about numeracy?

- 
- From a Meta-analysis:
    - Only three skill predict subsequent reading and math achievement: reading/language, math, and attention
    - Rudimentary mathematics skills appear to matter the most, with an average standardized coefficient
      - Math: 0.33
      - Reading Skill: 0.13
      - Attention-Related Measures: 0.07

(Duncan et al., 2007)





- Only 37% of Americans can pass a basic test of financial knowledge.
- 91% of Americans adults have felt anxious doing math.
- 40% of Americans will develop diabetes, but only 9% of Americans have the mathematical skills to manage treatment.


[www.countedoutfilm.com](http://www.countedoutfilm.com)



# Literacy→Numeracy

- Which parts of the literacy plan can inform the numeracy plan?
- What is missing?
- What does not fit?



- # Numeracy
- Is it an urgent priority?
  - Is it necessary to improve student outcomes (e.g., civic engagement, educational achievement, occupational goals, personal)?
- 
- ILLINOIS  
STATE BOARD OF  
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- 149

- Should the plan
  - Enhance and unify core numeracy instruction efforts statewide?
  - Outline supports and resources for numeracy reform ensuring all students receive developmentally appropriate and evidence-based instruction?



# Numeracy Plan Goals?

- G1: Every student receives high-quality, evidence-based **literacy/numeracy** instruction.
- G2: Every educator is prepared and continuously supported to deliver high-quality, evidence-based **literacy/numeracy** instruction.
- G3: Every leader is equipped to create, maintain, and sustain equitable conditions for high-quality, evidence-based **literacy/numeracy** instruction.

# Challenges/Opportunities Overview

1

## Identifying goals

- For the students
- For instruction

2

## Preparing Educators

- Teacher preparation
- Student teaching

3

## Supporting Educators

- Graduate school
- Embedded PD
- Self-guided learning

# Identifying Goals

## Goals for students

- What does numeracy for ALL students mean?
- What are the skills and proficiencies that we will identify as the goals?

## What can we draw on from prior recommendations?

- NRC (2000); NCTM (2000); CCSSM (2010)
- 5 key strands, Process Standards, Mathematical Practices

## How will we ensure that the definition of numeracy will remain relevant in the future?

- The tool defines the skill (Taylor, 1980)

# Identifying Goals

- Math has a PR problem
- Many parents and educators believe that students should be taught as they were taught, through memorizing facts, formulas, and procedures and then practicing skills over and over again (e.g., Sam & Ernest, 2000)



<https://www.youtube.com/watch?v=2YMbKh9a0Sk>

# Identifying Goals

- Goals for instruction
  - The goal seems to be to focus on high-quality **evidence-based** numeracy instruction.
  - Acknowledge that values and beliefs influence “evidence”
  - What do we have to build upon? For example;
    - The Five Practices (Smith & Stein, 2008)
    - Eight Mathematics Teaching Practices (NCTM, 2014)
    - Equitable Teaching Practices (NCTM, 2018)



# Identifying Goals

Effective Mathematics Teaching Practices
<b>Establish mathematics goals to focus learning.</b> Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.
<b>Implement tasks that promote reasoning and problem solving.</b> Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.
<b>Use and connect mathematical representations.</b> Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.
<b>Facilitate meaningful mathematical discourse.</b> Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.
<b>Pose purposeful questions.</b> Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.
<b>Build procedural fluency from conceptual understanding.</b> Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.
<b>Support productive struggle in learning mathematics.</b> Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.
<b>Elicit and use evidence of student thinking.</b> Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

(NCTM, 2014)



# Identifying Goals

- Will we agree? If not, how do we elevate all voices?
- How do we interpret "every student" and "receives"?
  - every student receives high-quality, evidence-based numeracy instruction. Does this include students with special needs, students in rural areas, racially minoritized students? “Gifted and talented” students?
  - “receives high-quality” instruction. Is it about outcomes or opportunities (Colman, 1968)? Who has the capabilities to access those opportunities?

# Challenges/Opportunities Overview

1

## Identifying goals

- For the students
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## Supporting Educators

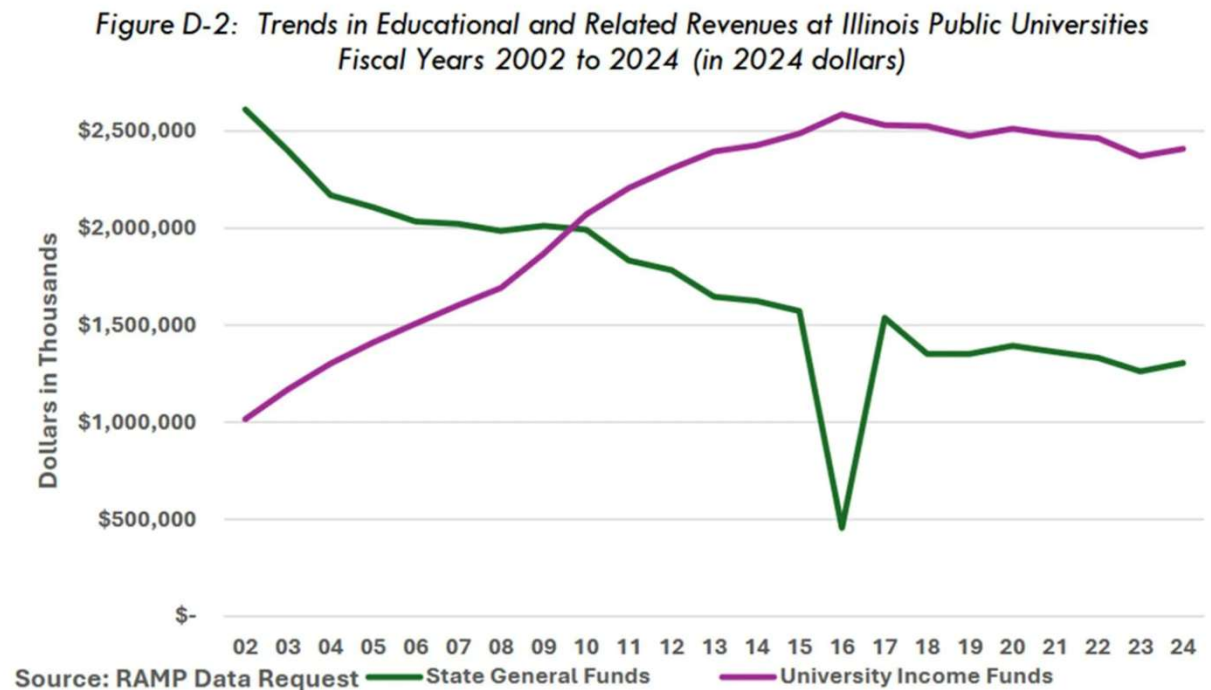
- Graduate school
- Embedded PD
- Self-guided learning

# Preparing Educators

- What will be the challenges/opportunities to ensure “every educator is prepared to deliver high-quality, evidence-based numeracy instruction”?

# Preparing Educators

- Access
  - Cost associated with getting a teaching degree (e.g., tuition, fees, content tests)
  - Who can afford these costs and who can't?



Source: RAMP Data Request

A graph from the Illinois Board of Higher Education shows funding changes from the state since the 2002 Fiscal Year, adjusted for inflation. The purple line represents university income from tuition and fees, and the green line represents funding from the state. (Source: IBHE)

# Preparing Educators

## Mixed messaging

- Different messages from different schools/departments, even instructors within a department (e.g., fixed vs. [growth mindset](#), learning styles, mathematical identities).

## Too much to prepare them for

- Content, pedagogical, pedagogical content knowledge, specialized content knowledge, technological pedagogical content knowledge... (e.g., Shulman, 1987; Ball, Thames, & Phelps, 2008; Mishra & Kohler, 2006)

# Preparing Educators

- Grade band specific challenges
  - Early
    - Math anxiety/negative mathematical identities
    - Demands of teaching all subjects
  - Middle
    - Some are not specialists (multiple endorsements)
    - Being prepared through other bands (e.g., elementary, secondary) with a few add on courses
  - Secondary
    - Double discontinuity (Klein, 1924/1933)
    - Disconnect between methods and content courses

# Preparing Educators

- Student teaching challenges
  - Lack of continuity from university to student teaching
  - Cooperating teachers aren't prepared or compensated with time to be student teacher mentors
  - The demands of the classroom students cannot be ignored
  - STs needing to work a part time job on top of the full-time student teaching to live
  - Wide variation in support and expectations at different student teaching placements

# Challenges Overview

1

## Identifying goals

- For the students
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## Preparing Educators

- Teacher preparation
- Student teaching

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## Supporting Educators

- Graduate school
- Embedded PD
- Self-guided learning



# Supporting Educators

- What will be the challenges/opportunities to ensuring “every educator is continuously supported to deliver high-quality, evidence-based numeracy instruction”?

# Supporting Educators

- Graduate School
  - How can we ensure equal access to graduate programs around the state?
  - How can we ensure that online graduate programs are of the same quality as in-person programs?
  - How can we ensure consistent financial support for graduate programs from schools/districts?

# Supporting Educators

- Embedded PD
  - How can we ensure equal access to instructional coaches across different schools/districts/regions?
  - What role can/should ROEs/ISBE/ICTM serve in this capacity?

# Supporting Educators

- Self-guided learning
  - Learn to analyze teaching in terms of student learning
    - setting learning goals for students,
    - assessing whether the goals are being achieved during the lesson,
    - specifying hypotheses for why the lesson did or did not work well, and
    - using the hypotheses to revise the lesson.

(Hiebert et. al., 2007)

# Locating Challenges & Opportunities

- Focus on where
  - University preparation
  - Student teaching
  - Graduate school
  - Embedded PD
  - Self-guided learning

# Unifying across all five: What happens where?

University  
teacher  
preparation

Student  
teaching

Graduate  
school

Embedded  
Professional  
Development

Self-guided  
learning

# Thank you

1

## Identifying goals

- For the students
- For instruction

2

## Preparing Educators

- Teacher preparation
- Student teaching

3

## Supporting Educators

- Graduate school
- Embedded PD
- Self-guided learning

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# Working Lunch Conversations on Key Findings

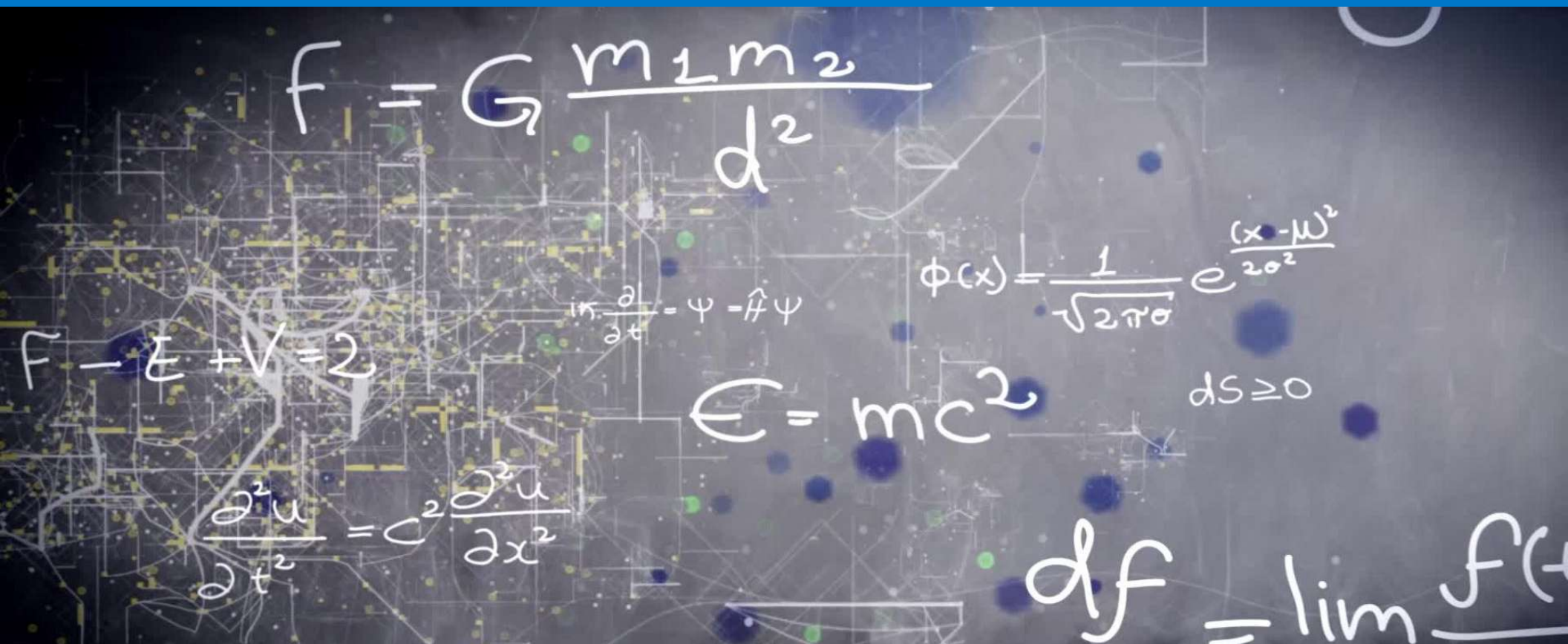
**Padlet Discussion Board**

What changes in math instruction are needed to better support learning, engagement, and success for all students?



How can we build teacher confidence and skills to expand math instruction to include other approaches like collaborative learning, inquiry-based teaching, and conceptual understanding?





## Implementation & Support



How can a numeracy plan be designed to reflect and respond to current research on the sociocultural dimensions of mathematics learning, particularly as it relates to identity, language, and access?

In what ways should educator preparation programs evolve to ensure that future teachers are equipped to recognize and build upon the diverse mathematical strengths that students bring to the classroom?

From your perspective, what shifts need to occur to ensure that professional learning and sustained support have the greatest impact on enhancing educators' capacity to deliver high-quality numeracy instruction?

How do we ensure these supports remain dynamic and responsive to evolving instructional needs as the implementation of the numeracy plan progresses?

How can math leaders balance the need for system-wide coherence with the flexibility to meet the diverse needs of individual schools, teachers, and student populations during implementation?



How can the state agency and districts strategically leverage partnerships with educator preparation programs, higher education institutions, and external organizations to build a cohesive pipeline of support for the implementation of a comprehensive numeracy plan?



# Summary & Next Steps

# Future Connection Points

If you are interested in staying involved or contributing to future opportunities, we invite you to complete this survey to provide your contact information.



Thank you once again for your commitment to strengthening student achievement across our communities.

— The ISBE Numeracy Team