

STRATEGIES VS. MODELS IN ADDITION AND SUBTRACTION

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Basic Adding Strategies

Make a Ten
Original problem: $7 + 8$
 $7 + 7 = 14$
8 is 1 more than 7, so you need to add one more, $14 + 1 = 15$
The answer is 15.

Doubles + or - 1
 $8 + 8 = 16$
7 is 1 less than 8, so you need to take one away, $16 - 1 = 15$
The answer is 15.

Counting up
 $8 + 4$
Start at 8 and count up 4 more.
8 9 10 11 12 13 14 15 16 17
10 11 12
8 9

Draw a Picture
 $4 + 3$

If YOU have a Math problem...
Yo, I'll Solve It!

Draw Pictures
 $3 + 2 = 5$

Number Line
 $3 + 2 = 5$

Make a Ten
 $7 + 3 = 10$

Count On...
 $3 + 2 = 5$

Use Fingers
 $3 + 2 = 5$

Use Objects
 $3 + 2 = 5$

Addition

Without Regrouping

Base Ten
 $52 + 45 = 97$

Expanded Form
 $50 + 2 + 40 + 5 = 97$

Number Line
 $52 + 45 = 97$

Standard Model
 $52 + 45 = 97$

SADDLE UP 1st and 2nd Grade

THINK ABOUT ADDITION AND SUBTRACTION...

What strategies
and models do you
use for these
operations in these
grade levels?



THE WORD STRATEGY AND MODEL ARE
SOMETIMES USED INTERCHANGEABLY

- What is the difference between a strategy and a model?
- Why do we care?
- How does the distinction help us teach more effectively?

WHAT IS A STRATEGY?
WHAT IS A MODEL?
WHAT IS THE DIFFERENCE?

STRATEGY

How you mess with the numbers, and use relationships and connections between numbers to solve a problem

Often a strategy is categorized, described, or named by the first thing you do with the numbers. Sometimes a strategy is best described as the overall plan on how you will use the relationships.

MODEL

A representation of your strategy, the way the strategy looks visibly. Modeling your strategy makes your thinking more clear to others because they can see the thinking and the relationships that went into your process.

The model might also be the tool you used to actually do the computation. Some models could be tools.

STRATEGY

How you mess with the numbers, and use relationships and connections between numbers to solve a problem

MODEL

A representation of your strategy, the way the strategy looks visibly.

FOR EACH OF THE STRATEGIES AND MODELS,
DECIDE IF IT IS A STRATEGY OR A MODEL

WHY IS THE DISTINCTION BETWEEN
STRATEGIES AND MODELS IMPORTANT
FOR INSTRUCTION?

“If the teacher is clear on the difference, the students tend to focus correctly on strategies and use models appropriately to represent those strategies.

However, if the teacher is not clear in their own understanding, the students languish in unsophisticated strategies...”

~Pam Harris

EXAMPLES TO EXPLORE

$7 + 8$ with a 10 Frame

$49 + 27$ with an Open Number Line

$16 + 7$ using Make Tens

WHAT IS THE IMPACT DISTINGUISHING
BETWEEN STRATEGIES AND MODELS
COULD HAVE ON MY INSTRUCTION?

Use and Connect Mathematical Representations

“When students learn to represent, discuss, and make connections among mathematical ideas in multiple forms, they demonstrate deeper mathematical understanding and enhanced problem-solving abilities”

~Principles to Actions, NCTM (pg 24)

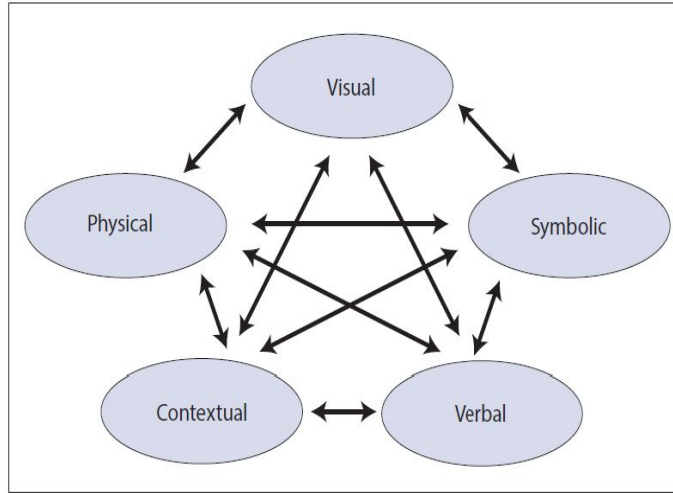


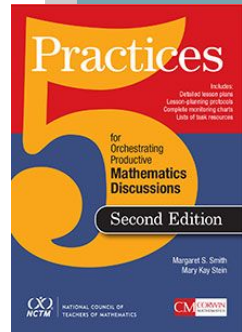
Fig. 9. Important connections among mathematical representations

USE AND CONNECT MATHEMATICAL REPRESENTATIONS

What are students doing?

- ✧ Using multiple forms of representations to make sense of and understand mathematics.
- ✧ Describing and justifying their mathematical understanding and reasoning with drawings, diagrams, and other representations.
- ✧ Making choices about which forms of representations to use as tools for solving problems.
- ✧ Sketching diagrams to make sense of problem situations.
- ✧ Contextualizing mathematical ideas by connecting them to real-world situations.
- ✧ Considering the advantages or suitability of using various representations when solving problems.

1. Anticipating likely student responses to mathematical tasks.
2. Monitoring students' actual responses to the tasks.
3. Selecting student responses to feature during the discussions.
4. Sequencing student responses during the discussions.
5. Connecting student responses during the discussions.



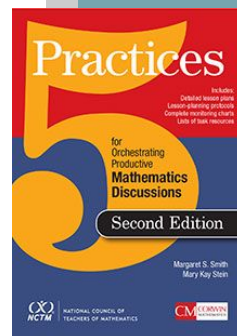
Strategy	Who and What	Order

Planning Page - Strategies and Models

Task:

Look-fors:

Who	Strategy	Model	What	Order



Planning Page - Strategies and Models

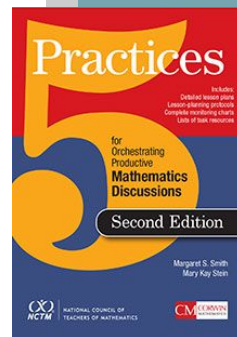
Task: $25 + 27$

Look-fors:

Focus on Near Doubles Strategy

Different models used to show this strategy

Who	Strategy	Model	What	Order
Student A	Near Doubles	Number Bond	$ \begin{array}{r} 25 + 27 \\ \quad \uparrow \\ 25 \quad 2 \\ 25 + 25 = 50 \\ 50 + 2 = 52 \end{array} $	
Student B	Near Doubles	open number line		
Student C	Near Doubles	Base-Ten Picture		
Student D	Decomposing by place value	open number line		



APPLICATION OF LEARNING

WHAT WILL BE THE IMPACT ON YOUR WORK WITH STUDENTS AND TEACHERS?

- The strategies we list for addition/subtraction (and now the models)
- The language we use with students
- The language students use
- The tools in our math toolkits
- Ways in which we assess (both formatively and summatively)
- ???

WHAT WILL BE THE IMPACT ON YOUR WORK WITH STUDENTS AND TEACHERS?

What does this extend to?

What does this conversation sound like for:

- Multiplication and Division
- Operations with fractions
- Operations with decimals
- Proportional thinking

WHAT ARE YOU COMMITTING TO?





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