# Share and Compare: Deepening Place Value Understanding Through Multiple Models K-2 

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## Place value understanding impacts...

...students' number sense.
...students' abilities to compare numbers.
...students' abilities to round numbers.
...students understanding of and fluency with multi-digit computations.
Consider the role of models and math talk to develop this understanding.

## Exploring Beginning Understandings



Bead Counters
Show 13

Rekenrek - Math Rack


What do you notice?
Do more trials, record, and discuss.

Explore in a Different Way Show 13 on double ten frames.


What do you notice?
Do more trials, record, and discuss.

## Linking Tens

Count 13 linking cubes.
Link 10 cubes together and find the total again.
How did you find the total this time?
Could you count on?
Which way would be easier? Faster?
Would the total always be the same? Why?
13 is 10 and more
Repeat with different amounts of cubes (11-19).
Discuss observations.

## Model and Compare

Students all use a different model to show 15.
Count out 15 individual units.
Bundle and observe.

- Cups and counters
- Links in a chain
- Counters on 10 frame
- Sticks and rubber bands
- Trains of unifix cubes

Did we all get the same thing? Why?
15 is 10 and 5 more

## Investigating 2-digit Numbers

1. Have partners count out 25 unifix cubes to show the quantity.
2. Have them make chains of ten and then check the total.

Which was easier to count? Why?
Which was faster? Why?
Do the different ways of counting give you the same answer? Why?
Create a chart to record students' data.

Observe and Consider

| Number | Tens | Ones |
| :---: | :---: | :---: |
| 25 | 2 | 5 |
| 32 | 3 | 2 |
| 47 | 4 | 7 |
| 26 | 2 | 6 |
| 38 | 3 | 8 |
| 41 |  |  |

What do you notice?
Does it make sense? Explain.
Tell your partner how many tens and ones are in 41.
Try it and see if you were right.

## Pose Problems

Dinner at the Panda Palace by Stephanie Calmenson - How many animals came to the diner? A Fair Bear Share by Stuart A. Murphy - How many nuts (or seeds) did the bears collect?


## Move from Bundling Objects to Pre-Bundled Manipulatives

## Introduce Base Ten Blocks

- Allow students to explore the blocks.
- Have students justify the value each block represents.


## Exploring Number Disks (non-proportional units)

Partners use different materials to show the same number (e.g. base ten blocks and number disks).
What do you notice about your models?
How are they alike? How are they different?

## Investigating how to mentally add and subtract 10 and 100 from a 3-digit number

Stuart Elementary School was preparing for a cookout.
They already had 121 paper plates, but knew they needed more, so they bought a package of 100 paper plates.
How many paper plates did they have for the cookout?

Modeling \& Observing What Happens
$\qquad$

Build the number.
Add a hundred.
Record the new number.

## Figuring Out the Rule

Repeat with other numbers.
What do you notice?
What digit changes? Why?

| 121 | 243 | 621 | 548 | 783 |
| :---: | :---: | :---: | :---: | :---: |
| 221 | 343 | 721 | 648 | 883 |

Predict: What is $468+100$ ?
Check your prediction with a model.

Brendan had 142 baseball cards in his collection.
His mom gave him a package with 10 more cards.
How many cards did he have in his collection then?
Add 10.
Where do you place the ten rod? Why?
What is the new number?

| Hundreds | Tens | Ones |
| :---: | :---: | :---: |
|  |  |  |

## Figuring Out the Rule

Repeat with other numbers.
What do you notice?
What digit changes? Why?

| 142 | 235 | 421 | 648 | 783 |
| :--- | :--- | :--- | :--- | :--- |
| 152 | 245 | 431 | 658 | 793 |

Predict: What is $368+10$ ?
Check your prediction with a model.
Does this make sense? Explain.

Chelsea Farms had 241 pumpkins to sell at the Fall Fair.
They sold 100 pumpkins on the first day.
How many pumpkins do they still have to sell?


What is $\mathbf{2 4 1 - 1 0 0 ?}$
What do you notice?
Does that make sense?

| Hundreds | Tens | Ones |
| :---: | :---: | :---: |
| 100 |  |  |
| $2+10$ |  |  |
| 2 | 4 | 1 |

## Observing and Discussing

(241-100 = (1)41
(4) $59-100=3,39$
(3) $75-100=275$

What do you notice?
Predict: What is 567-100?
Check your prediction with a model.
Tell your partner how to subtract 100 from a 3-digit number.

## Observing Models and Data

- Do students create the models and generate the data? Why is this important?
- How is the data organized and displayed? Why does that matter?
- Can students predict and generate next data? What does that indicate?
- Can students verbalize a generalization or rule based on their observations?

Teacher Resource Books by Sue O'Connell<br>Published by Heinemann (www.heinemann.com)

## Math in Practice (www.mathinpractice.com)

This series is filled with lesson ideas, instructional strategies, practice tasks, formative assessments, and numerous online printable (and customizable) resources to make teaching K-5 math more meaningful. In addition, it offers tips for teaching math through models and problems, and outlines deep questions to ask students related to each math lesson. There is a book for each grade level K-5 that contains a wealth of grade-specific activities, as well as a Guide for Teachers filled with instructional strategies and an Administrator's Guide designed for math coaches and teacher leaders. Visit www.heinemann.com/mathinpractice to preview the materials. And join the Math in Practice facebook page to chat about teaching K-5 math!

## Putting the Practices into Action - Implementing the Common Core Standards for Mathematical Practice K-8

 with John SanGiovanniThe Standards for Math Practice are the heart and soul of the Common Core State Standards. This book explains each standard in teacher-friendly terms and highlights practical activities to make the standards come alive in classrooms. It contains PLC study group questions and online resources.

## Mastering the Basic Math Facts for Addition and Subtraction <br> Mastering the Basic Math Facts for Multiplication and Division

with John SanGiovanni
Through investigations, discussions, visual models, children's literature, and hands-on explorations, students explore the math operations, and through engaging, interactive practice achieve fluency with basic facts. A teacher-friendly CD filled with customizable activities, templates, recording sheets, and teacher tools simplifies your planning and preparation. Over 450 pages of reproducible forms are included in English and Spanish translation.

## The Math Process Standards Series

Each book in this series is a practical guide for helping students refine their skills in the highlighted math process (problem solving, communication, reasoning, representations, connections). You will find specific teaching strategies and tips to help all students strengthen their skills. Included with each book is a CD filled with teacher tools and customizable student activities to allow you to change names, data, or spacing for a quick way to differentiate instruction within your classroom.
Introduction to Problem Solving

Introduction to Communication<br>Introduction to Reasoning and Proof

Introduction to Representation
Introduction to Connections
All books in this series are available for Grades PK-2, Grades 3-5, and Grades 6-8.

## Now I Get It: Strategies for Building Confident and Competent Mathematicians, K-6

Good teaching is the critical factor that helps students "get" math. This book is a practical handbook for the teaching of mathematics, with chapters addressing the teaching of problem solving, the use of manipulatives, differentiating instruction, effective teacher questioning, increasing math talk, and much more. The book includes a CD with over 100 pages of resources to support teachers including manipulative templates, math facts game templates, a bibliography of math-related literature, center ideas, math websites, problem-solving and writing tasks, and a variety of other practical resources.

For additional resources, visit Sue's website at www.qualityteacherdevelopment.com
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