

# Teaching Through Investigations: Empowering Students to Be Confident and Competent Mathematicians K-2

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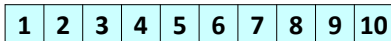
## Step back and let them think!

### Exploring the Concept of One More

Read *Ten Pigs: An Epic Bath Adventure* by Derek Anderson



What do you notice?  
Predict 1 more than 5.  
Try it. Were you right?  
How do you know how  
many pigs when 1 more  
pig joins?

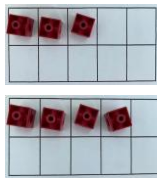


### Exploring the Concept of +1

Read *One More Dino on the Floor* by Kelly Starling Lyons

#### Lesson: Dinos on a Ten Frame

Turn to a page and read it.  
Students place counters to  
show the dinos on the floor.  
As each new dino joins,  
students add 1 more counter  
and tell you how many are  
on the dance floor then.



Record the equation on the board.  
 $3 + 1 = 4$

#### Record and discuss results.

$$\begin{aligned} 3 + 1 &= 4 \\ 5 + 1 &= 6 \\ 2 + 1 &= 3 \\ 7 + 1 &= 8 \end{aligned}$$

What do you notice?  
If there were 9 dinos and 1  
more joined, how many would  
there be?  
Try it. Were you right?  
Could you figure it out without  
using counters? How?  
What happens when you add 1  
to a number?

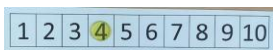
### Continued +1 Exploration for Practice

From *Navigating Numeracy Learning Progression Center Kits* by hand2Mind

#### Practice: Exploring for Understanding

##### Center 1: One More

Roll a number cube.  
Build the number on a rekenrek.  
Show the number on a number path.



Slide 1 more on the rekenrek  
and show the new number on  
the path.

"5 is one more than 4."



##### Center 2: Adding 1

Pick a 1-9 card.  
Build a train with connecting cubes.



Add 1 more cube.



Draw the train.  
Complete the addition  
equation.

$$7 + 1 = 8$$

##### Center 3: Fluency with +1

Pick a number card.  
Predict the sum and say the + 1 fact.  
Partner checks your thinking with a rekenrek.

Find and complete the equation. Take turns until  
someone fills them all.

$$\begin{aligned} \_ + \_ &= 2 \\ \_ + \_ &= 3 \\ \_ + \_ &= 4 \\ \_ + \_ &= 5 \\ 5 + 1 &= 6 \\ \_ + \_ &= 7 \end{aligned}$$

$$5 + 1 = 6$$



## How could you explore one fewer or -1?

Read *Ten on a Sled* by Kim Norman

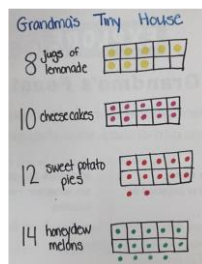
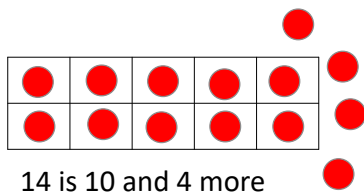


## A Focus on Place Value: Exploring Teen Numbers

Read *Grandma's Tiny House* by JaNay Brown-Wood

*What do you notice?*

Show 14.



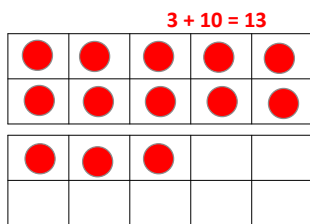
12 is 10 and 2 more  
14 is 10 and 4 more  
13 is 10 and 3 more  
What do you notice?

Is 12 more than 10? How do you know?  
Is 14 more than 10? How many more than 10?

## Using Place-Value Understanding to Make Sense of Math Facts

Read *Thanking the Moon: Celebrating the Mid-Autumn Moon Festival* by Grace Lin

What if Mama put 10 more mooncakes on the plate? How many mooncakes would be on the plate then?



MATH BOOK

**Try more. Record the data.**

3 + 10 = 13  
5 + 10 = 15  
8 + 10 = 18  
6 + 10 = 16

*What do you notice?*  
*Does it make sense?*  
*Predict the sum of 9 + 10.*  
*Try it and see if you were right.*  
*Could you add 10 to a number without using the ten frames and counters? How?*

MATH BOOK

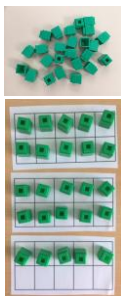
## Building on Place Value Understanding

### Our Investigation

1. Work with a partner.
2. Count out 25 unifix cubes.
3. Put the cubes on ten frames and then check the total.

*How did you find the total this time?*  
*Do different ways of counting give you the same answer? Why?*  
*How many filled ten frames in 25?*  
*How many leftover ones?*

Create a chart to record students' data.



MATH PRACTICE

### Observe and Consider

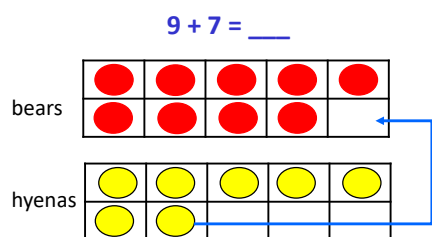
Number of Counters	Filled Ten Frames	Leftover Ones
25	2	5
32	3	2
14	1	4
26	2	6
38	3	8

*What do you notice?*  
*What do you wonder?*  
*Predict how many tens and ones are in 38.*  
*Try it and see if you were right.*  
*Can you figure out how many ten frames will be filled without actually filling them? How?*

MATH PRACTICE

## Investigations to Promote Fact Fluency

Read *Dinner at the Panda Palace* by Stephanie Calmenson



Do you see the total?



Do more trials and record the findings.

$$9 + 7 = 16$$

$$9 + 5 = 14$$

$$9 + 8 = 17$$

$$9 + 6 = 15$$

What do you notice?

Does it make sense? Why or why not?

How can you find the sum of  $9 + \underline{\quad}$  without using the counters?

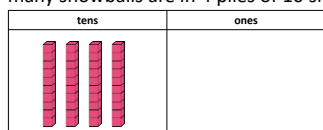


## Subtracting Multiples of Ten

Read *Pete the Cat Snow Daze* by James Dean

### The Snowball Fight

- What would you need to do to get ready for a snowball fight?
- Pete and Bob make piles of snowballs. They put 10 snowballs in each pile.
- Use tens rods to model 4 piles of 10 snowballs.
- How many snowballs are in 4 piles of 10 snowballs?



### The Snowball Fight

Pose more problems for students to model and solve.

Record the equations.

$$40 - 10 = 30$$

$$60 - 20 = 40$$

$$80 - 30 = 50$$

$$50 - 30 = 20$$

What do you notice?

Does it make sense? Why or why not?

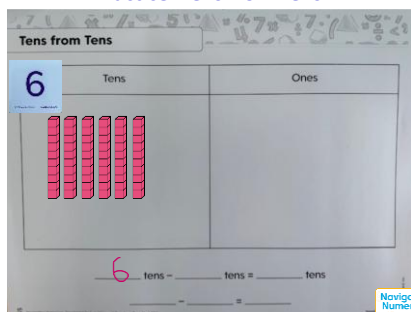
Predict  $70 - 30$ . Try it to see if you were right.

Can you find the solution without using a model? How?

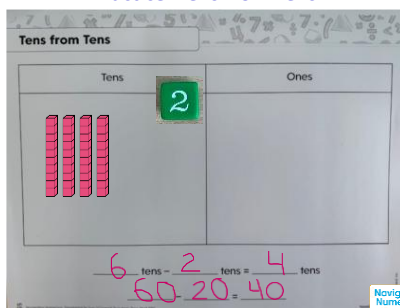
## Practice with Subtracting Multiple of 10

From *Navigating Numeracy Learning Progression Center Kits* by hand2Mind

### Practice: Tens from Tens

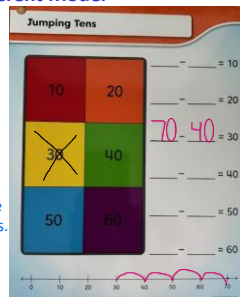


### Practice: Tens from Tens



### Practice with a Different Model

Roll for the number of tens to subtract. Start at 70 on the number line and show the subtraction. Write the equation that shows the difference. Cross out the difference. Take turns until someone crosses out all 6 numbers.



Follow Sue on Blue Sky @sueoconnellmath.bsky.social

Join Sue's Facebook group at <https://www.facebook.com/groups/MathinPractice>

Explore additional resources on Sue's website: <https://www.qualityteacherdevelopment.com/>

## Teacher Resource Materials by Sue O'Connell

### ***Math by the Book (Heinemann)*** ([www.mathbythebook.com](http://www.mathbythebook.com))

This series explores the teaching of math concepts through children's literature. Lessons, word problems, discussion questions, differentiation ideas, and practice tasks are all included to teach grade-specific skills and concepts through the story context. There is a book for each grade level K-5, including a wealth of online resources, and each book includes ideas for twenty skills taught during that year.

### ***Navigating Numeracy Learning Progression Centers (Hand2Mind)***

([www.hand2mind.com/navigating-numeracy](http://www.hand2mind.com/navigating-numeracy))

*Navigating Numeracy* center kits (Hand2Mind) provide everything you need for grade-specific, hands-on, and interactive practice opportunities that guide your K-5 students toward a deep understanding of numbers. Each kit contains 45 repeatable centers that span the skills you teach across the school year. The tasks are engaging and focus on the critical number skills that are a priority in our math standards. Each kit contains a teacher's guide, student task cards, game boards, spinners, game cards, and manipulatives so students can explore the skills through hands-on tasks.

### ***Math in Practice (Heinemann)*** ([www.mathinpractice.com](http://www.mathinpractice.com))

This series is filled with lesson ideas, instructional strategies, practice tasks, and many online printable resources to make teaching K-5 math more meaningful and more fun. 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*. Visit the website or [www.mathinpractice.com](http://www.mathinpractice.com) to view the materials.

### ***Putting the Practices into Action - Implementing the Common Core Standards for Mathematical Practice K-8 (Heinemann)*** with John SanGiovanni ([www.heinemann.com](http://www.heinemann.com))

The 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***

### ***Mastering the Basic Math Facts for Multiplication and Division***

(Heinemann) with John SanGiovanni ([www.heinemann.com](http://www.heinemann.com))

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. Online resources are filled with customizable activities, templates, recording sheets, and teacher tools to simplify your planning and preparation. Over 450 pages of reproducible forms are included in English and Spanish translation.