

## Grade 2: Number Sense and Problem Solving

MGSD, Summer 2014

### Pencil groupings

- A pencil packaging company puts 10 pencils in a box, 10 boxes in a bin, and 10 bins in a basket.
- Draw what you think a box, a bin, a basket, and a barrel look like. Try to draw close to scale/size. Compare your drawing with your neighbor.

### How many pencils?

- How many pencils are there if a store has:  
5 boxes and 7 single pencils?  
5 bins 7 boxes and 8 single pencils?  
5 baskets, 7 bins, 8 single baskets, 3 boxes, and 4 single pencils?....
- $$5000 + 700 + 8000 + 30 + 4$$
- $$13000 + 700 + 30 + 4$$
- $$10000 + 3000 + 700 + 30 + 4$$

### How many pencils?

- What was the math involved? What did you have to know?

### Packaging Pencils

- Now.... How can we group pencils in as few packages as possible if we have:
- 27 single pencils?
- 5 boxes and 16 single pencils?
- 1 basket, 12 bins, 27 boxes, and 39 single pencils?  
 $1000 + 1200 + 270 + 39$
- 1 basket, 1 basket, 2 bins, 2 bins, 7 boxes, 3 boxes, 9 pencils

### Packaging Pencils

- What was the math involved? What did you have to know?

### Article

- As you read...
- What are the big “take aways” as it relates to your classroom?
- What strategies have you used to help your students with the concepts mentioned in this article?

### Efficiency

- What does efficiency mean in terms of your students’ math work?
- How does efficiency relate to “speed” in math?
- Does efficiency matter in your grade?
- How can you guide students to becoming more efficient?

### Exploring some activities

- How many am I hiding?
  - Start with a specific number of cubes.
  - Take the cube tower and snap it behind your back.
  - Show part of the tower to your partner. They tell you how many cubes are still hiding.

### Activities

- 10 plus
- Pull three number cards and represent with counters
- $\_ + \_ + \_ = 10 + \_$

### Exploring some activities

- Target: 100
- Pull a number card.
- Add either that number of ones or tens to your total.
- You **must** play 9 rounds and your target is to get as close to 100 without going over.

### Exploring some activities

- How many am I hiding?
  - What is a good number for the beginning of the year for most students?
  - The middle of the year?
  - The end of the year?

### Exploring some activities

- Three number addition- Target 20.
  - Pull three number cards. The sum closest to 20 wins all the cards. If it is a tie play another round.
- Elemath.pbworks.com

### Exploring some activities

- Three number: addition and subtraction
  - Pick 3 cards. Add two cards and subtract one.
 
$$\underline{\quad} + \underline{\quad} - \underline{\quad} = \underline{\quad}$$
- Try to get as close to 5 as possible. Whoever is closest to 5 earns a point.
- For example, drawing a 3, a 4, and a 7...
- $$3 + 7 - 4 = 6.$$

- Addition and Subtraction

Independently...

- Write a brief one sentence description of each.
- What do each of them mean?
- Where do your students struggle?
- What does place value have to do with it?

### Problem Types

- Solve using cubes.
  - Solve using a picture.
  - Solve using a number line.
  - Write an equation.
- Lucy has 13 apples. Julie has 7 apples. How many more apples does Lucy have than Julie?

### Problem Types

- Solve using manipulatives.
  - Solve using a picture.
  - Solve using a number line.
  - Write an equation.
- Lucy has 18 fewer apples than Julie. Lucy has 9 apples. How many apples does Julie have?

### Problem Types

- Solve using manipulatives.
  - Solve using a picture.
  - Solve using a number line.
  - Write an equation.
- Julie has 18 more apples than Lucy. Julie has 21 apples. How many apples does Lucy have?

### Problem Types Debrief

- How was each task modeled?
  - manipulatives.
  - picture.
  - number line.
  - equation.
- Which ones are more difficult?
- Why?
- How can you help support students with these types of tasks?

### Problem Types...

- Let's see what the Common Core authors have to say about types of addition and subtract problems.

### Guess the Problem Type

- Grandma has 12 flowers. How many can she put in her red vase and how many in her blue vase?
- Sarah has 6 more hair clips than Martha. Martha has 11 hair clips. How many does Sarah have?
- There are 15 geese in the yard. Seven geese fly away. How many geese are left?
- There are 8 boxes of granola bars and 9 boxes of fruit snacks on the desk. How many total boxes of snacks are there.
- Tony runs a lap in 5 less seconds than Nico. Nico runs a lap in 14 seconds. How many seconds did it take Tony to run?

### Types of problems

- Last year, which problems:
  - Did you focus a lot on?
  - Did not focus enough on?
  - Did students do really well with?
  - Did students tend to struggle more with?
- Where do the different types of problems fit into your pacing guide and school year? All at once or scattered across the year?

### Types of Problems

- Brainstorm a few problems that you can take with you as you think about next year.
- Consider:
  - The type of problems
  - The size of the numbers in the problems
  - The language/wordiness of the problems
  - What support(s) students may need to be successful?

### Problem Types... one final point

- Students solve problems in different ways...
  - Direct modeling with manipulatives or drawings
  - Counting to solve tasks
  - Derived strategies with facts
  - Automaticity with facts

### Quick checkpoints for students

- Comes from Assessing Math Concepts program- mathperspectives.com
- Hiding assessment
- Changing numbers (adding and subtracting)  
From 5 to 8... how many do you add?
- Two digit addition and subtraction (mentally)

### Rigor

- What does rigor mean in terms of your students' math work?
- Does rigor matter in your grade?
- How can you increase the rigor in your classroom?

### Rigor...types of tasks

Memorization: What is  $8+7$ ?

Procedures without connections: There are 17 boys and 8 girls on the playground. How many children are on the playground?

Procedures with math connections: There are 17 boys and 8 girls on the playground. How many children are on the playground? Show your answer in pictures, numbers and words.

Doing Math:

There are 15 children on the playground. At least 5 of them are boys. How many boys and girls could there be? Find multiple answers. Show each answer with pictures, numbers, or words.

### Task Writing and [Resources](#)

- NCDPI Task website
- NCDPI math wiki- unit, Unpacking document
- Georgia Common Core units
- Elementarymathematics.org
  - Fractions unit
- Others?

### Number Talks

### Number Talks

- I want you to think about the number 51.
- What do you know about the number 51?
- Can you name some numbers smaller than 51 but close to 51?
- Can you name some numbers larger than 51 but close to 51?
- Can you think of a few addition equations and have 51 as your answer?
- Can you think of some two-digit subtraction equations where you have 51 as your answer?

### Number Talks

- What math concepts did you work with?
- Describe the questions... what were they like?
- How would you carry this out in your classroom?
- How long would it take your students to complete?

### Questions?