



CONSTRUCTING TASK: Addition Strategies

Approximately 2-3 Days

STANDARDS FOR MATHEMATICAL CONTENT

MCC.2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

MCC.2.OA.2 Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

MCC.2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

*****Mathematical Practices 1 and 6 should be evident in EVERY lesson.*****

BACKGROUND KNOWLEDGE

(Information quoted from Van de Walle and Lovin, Teaching Student-Centered Mathematics: Grades K-3, pages 169)

“The traditional computational methods for addition and subtraction are significantly different from nearly every invented method. In addition to starting with the rightmost digits and being digit oriented (as already noted), the traditional approach involved the concept generally referred to as *regrouping* (a very strange term), exchanging 10 in one place-value position for 1 in the position to the left (“carrying”)- or the reverse, exchanging 1 for 10 in the position to the right (“borrowing”). The terms *borrowing* and *carrying* are obsolete and conceptually misleading. The word *regroup* also offers no conceptual help to young children. A preferable term is *trade*. Ten ones are *traded* for a ten. A hundred is *traded* for 10 tens.

Terminology aside, the trading process is quite different from the bridging process used in all invented and mental strategies. Consider the task of adding $28 + 65$. Using the traditional

method, we must first add 8 and 5. The resulting 13 ones must be separated into 3 ones and 1 ten. The newly formed ten must then be combined with the other tens. This process of “carrying a ten” is conceptually difficult and is different from the bridging process that occurs in invented strategies. In fact, nearly all major textbooks now teach this process of regrouping prior to and separate from direct instruction with the addition and subtraction algorithm, an indication of the difficulties involved. The process is even more difficult for subtraction, especially across a zero in the tens place where two successive trades are required.”

ESSENTIAL QUESTIONS

- How can we solve addition problems with and without regrouping?
- What is a number sentence and how can I use it to solve word problems?
- How do we use addition to tell number stories?

MATERIALS

- Base Ten Blocks (Hundreds, Tens, and Ones)
- Place Value Mat
- “Addition with Regrouping” task sheet

GROUPING

Large group

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I

Give students this problem:

Lucy has 28 green candies and 46 blue candies. How many candies does she have?

Allow the children to utilize various strategies discussed in earlier task. Have their base ten blocks, place value mats, as well as number lines and number charts available to help them find the answer to the problem. While students are working, circulate and ask these kinds of questions:

- What are you trying to find out?
- How many red candies does Lucy have?
- How many blue candies does Lucy have?
- Are you using a picture, number, or words to organize your thinking?
- How is this problem similar to problems we solved before?
- Can you explain the strategies you are using to solve this problem?
- Could you use a different strategy to combine these amounts?
- Does it matter which number you begin with?
- Is there a way you can check your answer?

If students are using the place value map and blocks, these are questions you may ask:

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- Does it matter which number you begin with?
- How many ones do you need in the ones place to begin with? How did you figure that out? Which digit did you look at? What is its value in that place?
- How many tens do you need in the tens place to begin with? How did you figure that out? Which digit did you look at? What is its value in that place?
- What did you notice about the ones? What will you have to do with some of your ones? Can you trade them in any way?
- How many tens do you have now? Why did it change? How did you figure that out? Which digit did you look at? What is its value in that place?
- Can you explain the strategies you are using to solve this problem?
- Could you use a different strategy to combine these amounts?
- Is there a way you can check your answer?

After students have solved the problem, pull the class together for a class discussion. Allow several students to demonstrate their strategy.

Part II

Give students the Addition with Regrouping sheet to solve in partner groups. Have base ten blocks, place value mats, number lines or number charts available for student use.

While students are working, circulate and question students:

- What are you trying to find out?
- How can you use base-ten blocks to help you solve this problem?
- How many ones do you need in the ones place to begin with? How did you figure that out? Which digit did you look at? What is its value in that place?
- How many tens do you need in the tens place to begin with? How did you figure that out? Which digit did you look at? What is its value in that place?
- What did you notice about the ones? What will you have to do with some of your ones? Can you regroup them in any way?
- How many tens do you have now? Why did it change? How did you figure that out? Which digit did you look at? What is its value in that place?
- Can you explain the strategies you are using to solve this problem?
- How can you solve this problem using a number sentence?
- Is there a way you can check your answer?

Part III

After students have completed the problems, allow them to take turns sharing the strategy they used for each problem. Allow other classmates to make comments on the strategies and/or ask questions.

FORMATIVE ASSESSMENT QUESTIONS

- What are you trying to find out?
- How can you use base-ten blocks to help you solve this problem?
- How many ones do you need in the ones place to begin with? How did you figure that out? Which digit did you look at? What is its value in that place?
- How many tens do you need in the tens place to begin with? How did you figure that out? Which digit did you look at? What is its value in that place?
- What did you notice about the ones? What will you have to do with some of your ones? Can you regroup them in any way?
- How many tens do you have now? Why did it change? How did you figure that out? Which digit did you look at? What is its value in that place?
- Can you explain the strategies you are using to solve this problem?
- How can you solve this problem using a number sentence?
- Is there a way you can check your answer?

DIFFERENTIATION

Extension

- Allow students to make up their own three-digit addition story problems. They can solve their own problems or trade with a partner. Provide students with number cubes to create their own problems.

Intervention

- Some students may need additional support during the problem solving through additional questioning and scaffolding.
- Use pennies, dimes, and dollars to help with the understanding of regrouping and still have the same amount.

