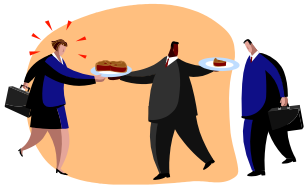


SCAFFOLDING TASK: Subtraction: Modeling with Regrouping

Approximately 4-5 Days

STANDARDS FOR MATHEMATICAL CONTENT

MCC2.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 MATHMATICAL 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 - 6 should be evident in EVERY lesson.** ***

BACKGROUND KNOWLEDGE

Students should have had prior experiences and/or instruction with addition and subtraction of two-digit numbers without regrouping. Students should also have experience regrouping using base-ten blocks.

Success with this task relies on student understandings of collections of objects in sets of ten as well as their understanding of how this relates to place value. Students need to have had multiple experiences with number lines, such as Shake, Rattle, and Roll Revisited. Though this activity was not intended to introduce the strategy of regrouping to students, it was designed to give students the opportunity to use a number line to experience the "action" of addition and the "action" of subtraction and how these two actions are opposite (inverse) operations. If students have had **MANY** opportunities to play and discuss those two games, **THEN** they should be ready for further discussion of subtraction and what the concept of "regrouping" means.

ESSENTIAL QUESTIONS

- How can we model and solve subtraction problems with and without regrouping?
- Can we change the order of numbers we subtract? Why or why not?
- How can we solve problems mentally? What strategies help us with this?
- How can mental math strategies, for example estimation and benchmark numbers, help us when adding and subtracting with regrouping?

MATERIALS

- Bags of Base Ten Blocks (at least 8 Hundreds, 20 Tens, and 10 Ones per pair of students)
- Place Value Mat
- "Subtraction with Regrouping" student task sheet

GROUPING

Large group, Partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
Give student pairs a copy of a place value board and a plastic bag with at least 8 hundreds blocks, 20 ten blocks, and 10 ones.

Have students place two hundred blocks on their place value mat. Each partner takes a turn rolling the dice. The student has to take away the number of ones that matches their roll. Demonstrate for students how to regroup their hundreds for tens. and their tens for ones. in order to subtract ones. Allow students to play until they reach zero ones. While students are playing, walk around and ask questions such as:

- How many (hundreds, tens, ones) do you have? What digits would be in those places? What is their value?
- How will you regroup your hundreds for tens?
- What is your new number? What digit would be in the hundreds place now? What is its value? How do you know?
- What is happening to your number? Why?
- How will you regroup your tens for ones? What digit would now be in the tens place? What would be the value of that digit? How about the ones place?
- Which place would have the largest digit in it right now? Does it also have the greatest value? How do you know?

Part II
Once students have played for a while, present them with this problem:

Lisa has $131. She has already spent $47. How much money does Lisa still have?

Ask questions such as:

- What are you trying to find out?
- How many money does Lisa have?
- How much money did Lisa already spend?
- What number do you need to represent on your place value mat first? Why?
- How many will you take away/remove? Why?
- What did you notice about the ones? What will you have to do in order to subtract? Can you regroup them in any way? How will this help?
- How many tens do you have now? What digit is now in the tens place? What is the value of that digit?
- How many ones do you have now? What digit is now in the ones place? What is the value of that digit?
- Can you explain the strategies you are using to solve this problem?
- 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 processes using the smart board or the overhead projector. If it has not been done so already, demonstrate the regrouping algorithm for students. Solve several more problems with the students, using both the base ten blocks and the numerical algorithm simultaneously. Have students explain/articulate what is going on when you are performing the algorithm. Invite discussion about whether they "like it" or not and have them explain their thinking.

Part III
Give students the "Subtraction: Modeling with Regrouping Revisiting" student task sheet to solve in partner pairs using base-ten blocks and the regrouping algorithm. While students are working, circulate and question students:

- What are you trying to find out?
- What number do you need to represent on your place value mat first? Why?
- How many will you take away/remove? Why?
- What did you notice about the ones? What will you have to do in order to subtract? Can you regroup them in any way? How will this help?
- How many tens do you have now? What digit is now in the tens place? What is the value of that digit?
- How many ones do you have now? What digit is now in the ones place? What is the value of that digit?
- Can you explain the strategies you are using to solve this problem?
- Is there a way you can check your answer?

Part IV
After students have completed solving the problems, allow students to take turns sharing the strategy they used to solve each problem. Allow other classmates to make observations and ask questions.

Parts V-VII of the task should be completed the following day.

Part V
Gather students in the class meeting area and present students with this story problem:

Mr. Lundquist has a very large family. One evening he brought home some potatoes for his family of sixteen children and his wife. Each person had a potato for dinner that evening. There were 21 potatoes left. How many potatoes did Mr. Lundquist bring home?

Have several students retell the story problem and discuss what is happening in the problem.

Part VI
Split students into pairs and give each student a half sheet of chart paper to use in solving the problem. Also, have various manipulatives available for students to use as they work to solve the problem. Walk around and observe students as they are problem solving.
Ask questions such as:

- What are you trying to find out?
- How many potatoes did his family eat? How do you know?
- Can you explain the strategies you are using to solve this problem?
- How many potatoes did Mr. Lundquist have at the beginning of the story?
- Are there other ways you can solve this problem?
- Is there a way you can check your answer?

As you are walking around, find students who are using a variety of strategies. Some students may draw a picture, solve the problem with manipulatives, use benchmark numbers, or use the traditional algorithm for subtraction with regrouping.

Let several students share their different strategies and answers to the problems.
Allow the students to call on their peers to ask questions or make comments about their strategy, and the answer that was found. After students have shared various strategies, spend some additional time discussing the use of benchmark numbers. Demonstrate for students how the problem could have been solved by breaking the larger numbers into number combinations that are easier to subtract. For example with 36-18, you can take 2 from 36 and give it to 18 to change the problem to 34-20. You can then subtract 20 from 30 to get 10 and 0 from 4 to get 4. The difference would be 14. Create a list with students of various strategies students can use when solving subtraction problems.

FORMATIVE ASSESSMENT QUESTIONS

Refer to questions in each of the sections I-VI

DIFFERENTIATION

Extension

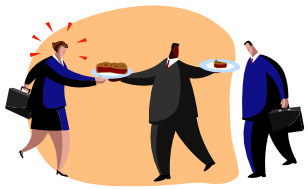
- Allow students to attempt regrouping problems with three-digits.

- Allow students to make up their own three digit subtraction story problems. They can solve their own problems or trade with a partner.

Intervention

- Some students may need additional support during the problem solving through additional questioning and scaffolding. Having them work with a partner who is very articulate about their mathematical thinking will also help.

Name: _____



Subtraction with Regrouping Problems Revisited

1. Sarah collects comic books. Her goal is to have 100 comic books. Right now she has 72. How many more comic books does she need to reach her goal?

2. Carolyn and Julia are selling pies to raise money for their club. Carolyn had 60 pies to sell. She gave some to Julia to sell. Now Carolyn has 38 pies. How many pies did Carolyn give to Julia to sell?

3. Seth has a collection of marbles. He gives 24 of his marbles to his cousin Blake. Now, Seth has 73 marbles left. How many marbles did he begin with?