Mathematics Lesson Plan for 2nd Grade

For the lesson on April 29, 2010
At DePaul University
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1. **Take It Away!**

2. **Goals of the Lesson:**
   a. Students will use subtraction facts 0-10 to help solve 2 digit subtraction problems
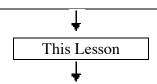   b. Students will be able to use new subtraction methods to solve 2 digit subtraction problems.

3. **Relationship of the Lesson to the Standards**

Previous Learning Standards

IL.6.B.4a – Explore and apply properties of addition and subtraction.
IL.6.B.5a – Compute using fact families.
IL.6.C.1b - Explain and use mental math strategies to solve simple addition and subtraction problems

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This Lesson

Post-lesson Learning Standards

IL.6.B.5b - Demonstrate fluency with basic addition and subtraction facts.
IL.6.C.2c - Select appropriate methods and tools for computing with whole numbers from mental computation, estimation, calculators, and paper/pencil according to the context and nature of the computation and use of the selected method or tool.

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4. **Considerations in planning the lesson:**

Subtraction is an important concept that students are taught at an early age and is one of the four basic, yet crucial, arithmetic operations. The use of subtraction and the implementation of subtraction strategies apply not only to an academic level but also to a day-to-day level, found in all aspects of life. Therefore, it is essential that students develop a deep understanding of subtraction in their elementary years, which will undoubtedly carry on in the latter years of their educational development.

We use the Everyday Math Curriculum, and although the lesson we are choosing to use is not an Everyday Math lesson, we took careful consideration about students' prior work with subtraction in Everyday Math. In the 2nd grade Volume 1 book, lesson 6-5, students work with subtracting numbers that involve a "10" such as 48-10, 72-10, ? = 48 – 20. Students are also encouraged to use multiple methods when subtracting such as Counting Up, Counting Back, thinking about the numbers as money and the use of manipulatives such as pennies or base 10 blocks. Students are posed with problems involving subtraction with regrouping and subtraction without regrouping in the same lesson. We wonder if this has an impact on whether or not students really understand the idea of subtraction with regrouping and how to manipulate the use of the "10" to help them in solving these types of subtraction problems.

The idea for this lesson came from the need to correct certain misconceptions that students face when subtracting. From our observations we have found that there is a common misunderstanding that often persists in the elementary level. The concept of regrouping seems to be one that affects the understanding of subtraction in a profound manner. We have noticed that in the 3rd grade, students still struggle with examples such as:

$$12 - 9 = \square$$

A common error is that the difference equals seven. Students subtract the 2 from the 9 to arrive at 7, which is not correct. Why does this occur? How can we correct this misunderstanding? These are questions we hope to answer in these lessons. Therefore, these series of lessons will focus primarily on evaluating methods that are most effective when solving subtraction problems involving regrouping. We will focus on a method which involves composing/decomposing numbers. Students will use the "10" to help them in solving subtraction problems with regrouping.

We have found that students are often impaired by their lack of vocabulary development. This is particularly true for our English Language Learners (ELL). The majority of students participating in this research lesson include ELLs. It is therefore important that we support our ELLs through vocabulary acquisition. In this lesson, previewing vocabulary will support English Language Learners, we did this in our first two lessons by making sure that students understood what the word "fewer" meant. Students initially thought that fewer meant that you would have more of something because they heard "a few more", this became a point of discussion for students to think of a different context with the root word of "few" being used. Our goal is that after the series of lessons, the students will be able to successfully evaluate and acquire new methods that will aid them with the concept of regrouping in subtraction.

5. **Unit Plan**

Lesson	No. of days	Description
1	1	Students will identify many names for whole numbers in sets of ten: Ex: **50** can also be named 40 + 10, 30 + 20; 10+10+10+10+10 Ex: **43** can also be named 10+10+10+10+3; 20+10+10+3

| 2 | 1 | Students review how to write 27 as a composition of 2 or more numbers.
Ex: 17+10

Students work through the following problem:
Julio and Maria went to recess. Julio jumped 43 times with a jump rope. Maria jumped 8 fewer times. How many times did Maria jump?

    a.   What does fewer mean?
    b.   How might we solve this?

Students think about the word "fewer" and what it means within the context of a number story involving subtraction.

Students think about a method they could use to solve the number story and then share with the class. |
| *3 **Research Lesson** | 1 | Two-digit subtraction |

6.   Instruction of the Lesson

In this lesson, students are expected to evaluate subtraction methods that will allow them to subtract with regrouping. This coincides with the Illinois State Standards:

IL.6.C.1b - *Explain and use mental math strategies to solve simple addition and subtraction problems.*
IL.6.C.2c - *Select appropriate methods and tools for computing with whole numbers from mental computation, estimation, calculators, and paper/pencil according to the context and nature of the computation and use of the selected method or tool.*

The research lesson is not an actual lesson from the 2nd grade Everyday Math Curriculum, but it is a lesson that is based on a Japanese Textbook (Tokyo Shoseki) and appears in first grade. It is also important to note the lessons that lead up to this lesson are not lessons from the Every Day Mathematics curriculum.   The Japanese Textbook teaches subtraction without regrouping during one set of lessons and later teaches subtraction with regrouping during the following set of lessons, the curriculum calls for problems such as 47-19, where students work through 2 digit subtraction problems and later goes into 2 digit minus 1 digit subtraction problems such as 47-9.

From our work in the first run through of the lesson, we discovered that students are very dependent on the use of the number line, hundreds chart and their fingers.   Students are not comfortable doing subtraction without these tools.   During this lesson, we would like for students to think about the various methods that can be used to solve subtraction problems without the use of a hundreds chart, number line, or their fingers.

7. Plan of the Lesson

Steps, Learning Activities Teacher's Questions and Expected Student Reactions	Teacher's Support	Points of Evaluation
1. Introduction TEACHER: "Good morning students, I hope that you had a nice ride over to DePaul from Sabin. I thank you for coming and look forward to allowing me to learn from you today." TEACHER: "Please look around you and wave to the teachers and cameras…. Everyone is here today to learn about the way that you and I learn together. Please treat today as any other day in your classroom. Try to speak as clearly and loudly as you can so that we all can hear from you." Who remembers what we did the last two days together? Let's think about the methods that Malina, Delphyne and Bryan used. Malina: (Tallies) $43 - 8 = \square$ 43, 42, 41, 40, etc…35. Delphyne: (Counting with fingers) $43 - 8 = \square$ $43 - 8 = 35$ Students uses fingers to arrive at 35. Bryan: (Using a "10" to solve the problem.) $43 - 8 = \square$ $43 - 10 = 33$ $33 + 2 = 35$	Make sure that students have found correct seat as well as have name tags/cards at their seat Emphasize the different methods that students used, think about Bryan's method from day 2 and the use of breaking off a "10"	Are students comfortable, given a different learning environment? Do students recall concepts taught in the previous lessons?
2. Posing the Problem On chart paper, the following problem is posed: Julio and Maria went to recess. Maria jumped 37 times with a jump rope. Julio jumped 18 fewer times. How many times did Julio jump? TEACHER: "Before you solve the problem, I want you to think about how you might solve the problem first. Most of us were comfortable using our fingers, a number line or a hundreds chart when subtracting yesterday. Today I want you to think and use new methods for subtraction." TEACHER: "What are all of the methods that you might be able to use to solve this problem?" "By yourself, think about the methods that you can use to	Teacher will show poster and read problem aloud with the class. Teacher will verify if students are reading along and making sure they understand the problem. *Students will not have paper and marker until after they have thought about their method. Give students a few sheets of blank paper and a marker to solve the problem.	Are students thinking about various methods? Are students comfortable sharing their methods with their partners? Are students identifying that they can use counting back, a number chart, decomposition/composition of numbers?

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solve the problem." (60 sec.) "Now talk to your partner and share your idea in solving the problem." (60 sec.) TEACHER: "Alright students, now I'm going to give you and your partner time to solve the problem. Please write very big and clear. Do your best to show exactly what you were thinking as you solved the problem. Please write in words how you solved the problem."	Walk around room identifying various ways that students solved the problem If students are struggling, ask questions such as… "can you tell me what you are doing?" "What do you know about the problem?" "What does the word fewer mean?" "What methods did we think about yesterday?"	
3. Anticipated Student Responses $37 - 18 = \square$ $37 - 18 = 19$ **Correct Responses:** • Student uses tallies to arrive at 19. • Student uses fingers to count back or count up. • Student uses a number line to count back or count up. • Student uses pictures. • Base 10 block representations. • Student uses decomposition/composition of numbers. ➢ $37 - 20 = 17$; $17 + 2 = 19$ ➢ $37 - 10 = 27$; $27 - 10 = 17$; $17 + 2 = 19$ **Incorrect Responses:** • Count using fingers but miscounts to arrive at "18". • Student adds the two numbers. ➢ $37 + 18 = 55$ • Student regroups numbers incorrectly. • Student says that answer is 21 because 8-7 = 1 and 3-1 = 2 • Student misuses the decomposition/composition method.	Ask student to re-check their work What does the word "fewer" mean? Ask the student how he/she would write the problem.	Are there varying methods which students are using to solve the problem?
4. Comparing and Discussing The teacher brings the class back together Teacher asks students to come up that used tallies, counting back with fingers, counting back with a number line, pictures (in any order) and share their method with the class. Teacher then asks student to come up that uses an unfamiliar method – such as decomposition of numbers and explain their method with the class.	As students are recording their responses, the teacher is looking for various methods that students used to solve the problem. If there is errors in counting back, teacher will address incorrect solutions by having students with correct responses discuss the error.	Are students able to recognize how decomposing/composing numbers will help them while subtracting?

What do you think about these methods? Do they work?	If students do not use the decomposition/composition method, the teacher will ask students to think back to the work done on Day #2 where Bryan begins thoughts around composition and decomposition of numbers.	
5. Summing up Today we learned from each other different methods to solve subtraction problems. Although using our fingers, a number line, hundreds chart or pictures might be something that we are familiar with, we now know that there are other ways that we can think about subtraction. Before we leave, I am going to give you one more problem to solve. I would like you to use this last method we talked about to solve this problem. **Evaluation:** Julio and Maria went to recess. Maria jumped 24 times with a jump rope. Julio jumped 15 fewer times. How many times did Julio jump?		Do students use a different method than initially used? Are students using the composing/decomposing method for subtraction? Do students successfully regroup?

8.   Evaluation

>Exit Slip – Students complete the following exit slip in order to assess their understanding of the lesson:

Are students using a method for subtraction which involves decomposing and composing numbers?

Julio and Maria went to recess. Maria jumped 24 times with a jump rope. Julio jumped 15 fewer times. How many times did Julio jump? Please use the last method we talked about.   Write in words how you solved the problem.

9. Board Plan

Work from previous lessons	Problem Statement	Familiar Methods	Unfamiliar Methods	Evaluation Statement
This includes posters, and examples of student work from the previous two lessons.	Julio and Maria went to recess. Maria jumped 37 times with a jump rope. Julio jumped 18 fewer times. How many times did Julio jump?	*Student's methods for Subtraction will be posted:* 1. Tallies 2. Pictures 3. Number Line 4. Hundreds Chart	Decomposition/Composition of Numbers	Julio and Maria went to recess. Maria jumped 24 times with a jump rope. Julio jumped 15 fewer times. How many times did Julio jump? Please use the last method we talked about. Write in words how you solved the problem.