

Frame for Math Instruction

I have chosen a small group math lesson from ED616 to demonstrate my proficiency in math instruction (Appendix A). The assignment document describes the lesson plan, the outcome with reflection, and artifacts. The small group intervention lesson was with three students who needed help with borrowing while subtracting two digit numbers. My practicum host school used Saxon Math curriculum which had students doing more advanced work. Place value and borrowing was an abstract concept for most second graders in my practicum class but a lot of them rose to the occasion. This small group work was an attempt to get a few students caught up.

This small group lesson entailed using LEGOs™ as math manipulatives. This method aligns with my philosophy of teaching math because I recognize that students benefit from making the abstract ideas in math more tangible through the use of math manipulatives. (Van De Walle, 2013; Couture, 2012).

I continue to use math manipulatives in my practice as I have found them invaluable in supporting student understanding. My students use flats, sticks, and cubes to learn place value. They use counting squares (tiles) to learn multiplication by making arrays. I have found that fraction tiles are effective tools when learning fractions and especially comparing fractions. By using these math tools, my students go from struggling to understand abstract mathematical ideas to learning by touch, manipulation, and visualization (Slavin, 2012; Van De Walle, 2013).

Another important aspect of my math instruction is differentiated instruction and work time. I allow my students who are comfortable working ahead to do so. I check for understanding with the entire group to ensure those individual workers are still “getting it.” Small group instruction continues to be a beneficial practice in my classroom. I recognize the stratification of mathematical abilities that will be ever present in my classroom. Therefore, I implement differentiated strategies to ensure mathematical achievement for all the types of learners in my care (Tomlinson, 2001).

References

- Allen, C. (2007). An Action Based Research Study on How Using Manipulatives will Increase Students' Achievement in Mathematics. Retrieved from: <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED499956&site=ehost-live>
- Couture, K. (2012). Math Manipulatives to Increase 4th Grade Student Achievement. Retrieved from: <https://files.eric.ed.gov/fulltext/ED534256.pdf>
- Slavin, R. E. (2012). *Educational psychology: Theory and practice*. Boston, MA: Pearson.
- Tomlinson, C. A. (2001). *How to differentiate instruction in mixed-ability classrooms*. Alexandria, Va.: Association for Supervision and Curriculum Development, ©2001.
- Van De Walle, J., Karp, K. S., & Bay-Williams, J. M. (2013). *Elementary and middle school mathematics: Teaching developmentally*. Upper Saddle River, NJ: Pearson Education.

Appendix A

Lesson Design Template: MAT/Certification Elementary

Candidate Name: Alison K. Annis		Host Teacher Name: Holly Boothe	
School: Birchwood ABC		Grade Level: 2	# of Students: 3
Date & Time of Lesson: 2/23/2015, 2:45		Length of Lesson: 40 minutes	
Topic of Lesson: Borrowing from the 10s and 100s for subtraction.		Content Area: Math	
Materials: Include all materials including technology: LEGOs - small, medium, and large. Paper and pencils.			

Alaska Standard: 2nd Grade Math:

Use place value understanding and properties of operations to add and subtract.

2.NBT.5. Fluently add and subtract using numbers up to 100.

Use:

- strategies based on place value
- properties of operations
- and/or the relationship between addition and subtraction.

STAGE ONE

Objective(s):
 1. Students will subtract using strategies based on place value.
 2. Students will subtract using properties of operations.

STAGE TWO:

Student Assessment:
 1. Students will recognize when they need to borrow from the tens column and carry out the operation.
 2. Students will complete subtraction problems that require borrowing with accuracy.

STAGE THREE: Opportunities to Learn

Introduction/Hook We are going to use LEGO bricks to help us to understand borrowing when subtracting.	
Processes and products	Differentiation/Accommodations/Modifications

Give each student a piece of paper and make sure they have a pencil and eraser.

Decide on the first problem we want to work on as a group and write it on the paper.

Choose a smaller number, making sure to have a larger number in the “ones” column on the bottom than on the top. (i.e. $83 - 65$),

Pass out medium LEGO bricks that represent the number of 10s and small LEGO bricks that represent the number of ones for the large number only. (8 tens and 3 ones)

Ask if we can take five bricks away from the ones column.

If we can't, where can we get more ones?
“Borrow from the 10s!”

Trade one medium brick for ten small bricks and stack them on your ones column.

Now count the number of tens and the number of ones you have.

Take away five ones (for the 65 you are subtracting from 83).

Since you only have 7 tens left, take 6 bricks away from the tens column.

How many are left? 18

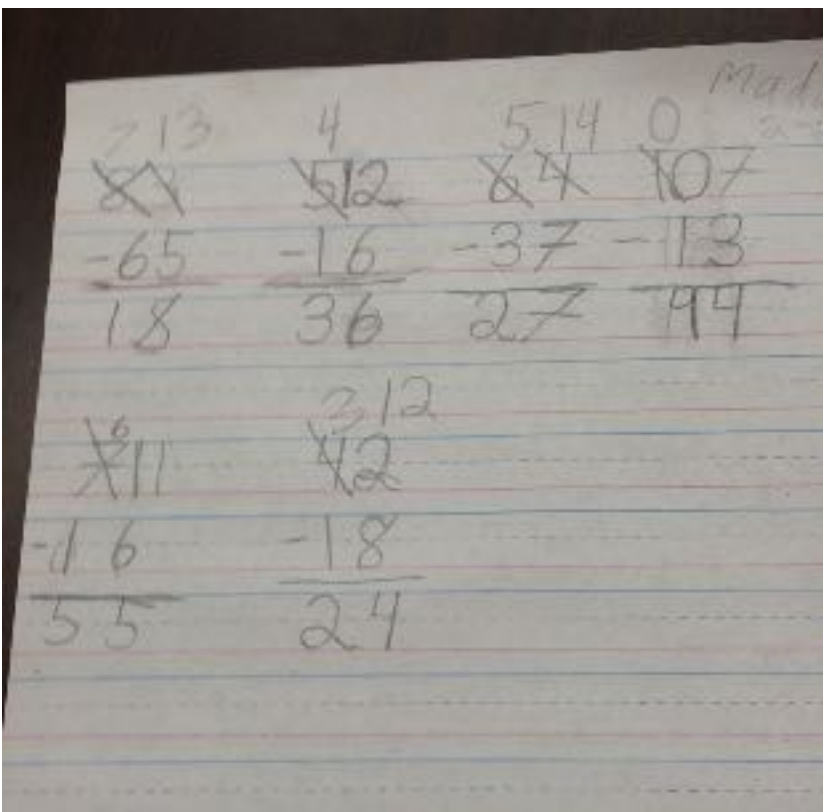
(practice several more times on other number combinations)

Use a large brick to represent the 100s column and practice borrowing from the 100's as well.

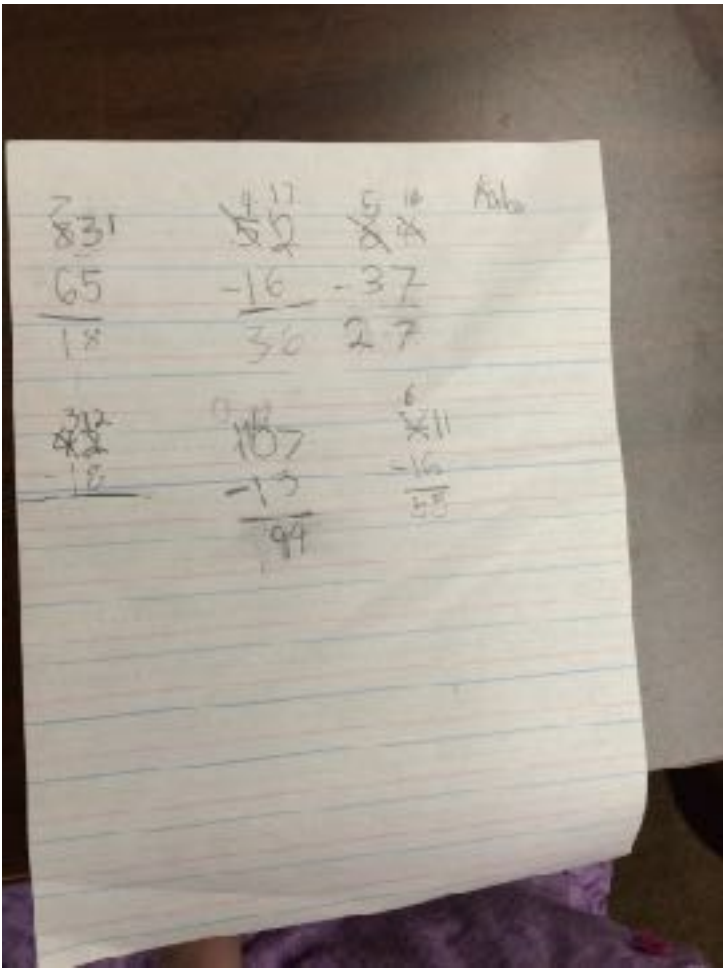
Closure:
Do a problem or two without the bricks.

Attachments: 3 artifacts of student work

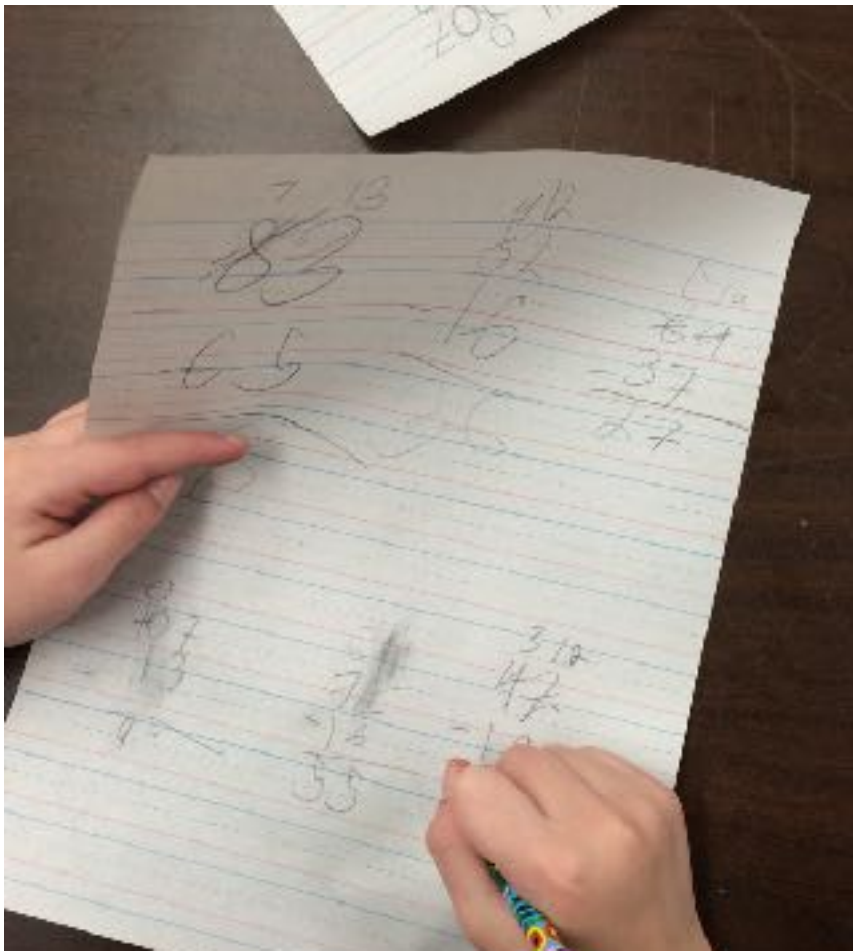
Stacking the LEGOs to make the tens and ones columns.



This is Maddison's work. She Seemed to be "getting it" after the first two problems. The three digit number problem we did last but she put it in the top row of her work paper.



This is Kalea's work. Using the LEGO bricks seemed to help her. She must have been focusing on her bricks to get the answer to $42 - 18$ because she didn't write the answer down, just the borrowing part.



This is Julia's work. She struggles a bit more with her math and I don't think this exercise was helping her as much. She was easily distracted by people coming in and out of the room we were using and she couldn't see the LEGOs as tens and ones. She seemed to only see them as LEGOs. I wasn't expecting that. It made an already abstract idea a bit more abstract for her. She is an ELL student so maybe it would help her for the ELL teacher to do some math with her.

Reflection:

I thought this lesson using hands-on 'things' to represent the numbers would significantly help these struggling students to conceptualize borrowing from the tens column. Surprisingly, I don't think it did. Instead, it was not unlike just talking about it. I couldn't believe how long it took us to just get through six problems and that was with using the manipulatives, repeating myself, asking questions, saying it another way, etc.. They seemed to "get it" and then when we went on to the next problem, they struggled all over again.

I told them that I remember borrowing being hard to get when I was in second grade. They said, "What did you do?!" I told them that I just kept practicing until I got it. They seemed okay with that...they know it will take practice. I guess that's the good thing. No one gave up and no one feigned ignorance (as one of these girls has a history of doing) so that was progress in and of itself.

I think they felt special (in a good way) because they were concerned about whether or not I was going to do this special lesson with anyone else from the class. I told them, "no."

I think if I could do this small lesson again I might change strategies and just use the expanded form on paper like I did for the other small group lesson. That seemed to be effective for understanding in only 10 minutes. This took 40 and I'm not sure they got it. Of course, it may have just been because of the student who I worked with but it could be the strategy too. I feel like I owe it to this group of girls to try to introduce subtracting with borrowing using the expanded form. It might be easier for them to conceptualize than having manipulatives to work with.

Alison expected this group of students to:

- a) really struggle because of the LEGOs
- b) understand more easily because of the LEGOs
- c) just play with the LEGOs and not do math
- d) remain confused because borrowing is hard