Lesson Participation and Observation Field Assignment for Mathematics Instruction

CIED 312: *Language and Communication in Multiple Contexts*

Southern Illinois University Edwardsville Department of Teaching and Learning

Olivia Hess

Lesson Title: Subtraction

Cooperating Teacher: Rachel Whitener

Kreitner Elementary School Fourth Grade

Collinsville Unit School District #13

**CIED 312 Mathematics Lesson Plan**

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| **Component 1: Learning Context** | | | | | |
| Teacher Candidate Name: Olivia Hess | | | Section Number: 103 | | |
| Cooperating Teacher Name: Mrs. Rachel Whitener | | | | | |
| School: Kreitner Elementary School | | | Room: Rachel Whitener’s Room | | |
| Date: 9/18/2024 | Grade level: 4 | | Time Needed: 1 ½ hours | | |
| Mathematical Topic/ General Concept: Subtracting with zeros | | | | | |
| Teacher Candidate Role:  \_\_\_Taught with cooperating teacher observing  \_X\_ Co-taught with cooperating teacher  \_\_\_Assisted cooperating teacher instruction | | Lesson Duration:  12:30PM-2:00PM 9/18 | | | |
| **Prior Knowledge Prerequisite(s) for Learning: (What have students learned about this topic prior to this lesson?)**  They understand that subtraction is the opposite of addition.  They understand that 9+9=18 and 9-9=0  Two digits of a two-digit number represent the number of tens and ones in that number  How to count by 1s to 100 | | | | | |
| **Student Misconceptions About the Topic:**   * The larger number must subtract first * When subtracting multi-digit numbers, the students often subtracted the smaller number from the larger number rather than regrouping. * The students often make the mistake of regrouping across zeros | | | | | |
| **Class Demographics: Include relevant interest, knowledge, cultural, and community assets in this section. This description is not a simple, comprehensive list of characteristics; student characteristics chosen should be aligned with your lesson topic.**  In a school where 95% of the student population is Hispanic and many students come from low-income backgrounds. Many students may be interested in music and family activities which are significant in Hispanic culture. Incorporating scenarios that involve budgeting can make subtraction more relatable and engaging for students. Students likely have foundational knowledge of basic math operations, but their experiences with practical applications can vary. Some may have had exposure to informal methods of problem-solving at home or in their communities, which can be built upon during lessons. Recognizing these prior experiences can help students feel more confident as they learn new concepts. Understanding the community context is vital. Many families may work in local businesses, such as markets or restaurants, providing real-life contexts for subtraction problems, such as calculating costs or making change. Additionally, community events like fundraisers can serve as excellent scenarios for applying subtraction in practical ways. It's crucial to create a safe and supportive environment where students feel comfortable discussing their experiences. By acknowledging their realities and integrating them into the lesson, I can help students see the value of math in managing resources and planning meals, thus reinforcing their learning while respecting their backgrounds. | | | | | |
| Materials Needed for the Students | | | | Materials Needed for the Teacher | |
| Pencils | | | | Teacher’s workbook | |
| Math workbook | | | | Answer key | |
| Computers | | | |  | |
| Fingers to add/subtract | | | |  | |
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| \*The student I interviewed had interest assets in the following areas that are different from mine:  \_\_interest in school \_\_interest in lesson topic \_\_interest in class colleagues \_X\_ interest in teacher  \*The student I interviewed had knowledge assets in the following areas that are different from mine:  \_\_skills mastered \_\_knowledge of lesson topic \_\_interpersonal skills needed to learn with others \_X\_ prior life experience  \*The student I interviewed had cultural assets in the following areas that are different from mine:  \_\_X\_ race \_X\_ Social class \_\_gender \_\_language \_X\_ Culture  \*The student I interviewed had community assets in the following areas that are different from mine:  \_X\_ school cultural diversity \_\_student knowledge diversity \_X\_ Economic class of school neighborhood \_\_teacher/administrator experience  \*At least two characteristics in each category of learning assets must be checked to identify a student participant as different from the interviewer. | | | | | |
| **Component 2: Learning Objective with Common Core State Standards for Mathematics Identified** | | | | | |
| Learning Standard Given by Cooperating Teacher: 4.NBT. 4 Numbers base 10.4  4.NBT.4: I can fluently add and subtract multi-digit whole numbers using the standards algorithm  This standard emphasizes the importance of not only being able to subtract multi-digit numbers but also doing so with fluency and accuracy. Students are expected to understand place value, which is crucial for borrowing and regrouping, when necessary, especially when dealing with zeros in subtraction. | | | | | |
| **Learning Objective Given by Cooperating Teacher:**  Use number sense and regrouping to subtract across zeros | | | | | |
| Cooperating Teacher Interview Question  **What do we want students to learn when we teach and learn this lesson with them? How does your response to this question align with the lesson standard and objective you gave me for this lesson?**  Initial and Elaborated Response:  The goal for this lesson is to have the students notice and execute that when there is a zero on top in subtraction, we must go next door until there's a whole number that we can borrow from. It aligns to the objective and the standard because they both state that the students should be able to independently subtract whole numbers, and today's lesson will help build on this skill. I noticed that she was very positive in our conversation when I asked these questions. She was eager to let me know that most of the students will grasp the concept of subtracting with zeros. But she was worried for some students that wouldn’t catch on. To address these concerns, we discussed the importance of differentiated instruction. For those who find the concept challenging, we can provide additional support through targeted small group sessions and hands-on activities that reinforce the borrowing process. Using manipulatives or visual aids can help these students visualize what it means to borrow from the next place value.  Diverse Student Interview Question  **What do you want to learn from this math lesson? How do want us to teach mathematics to you?**  “I liked that you helped me answer hard questions, like the word problems. It helped to switch teachers because it showed her a different method of subtracting.” Since Mrs. Whitener and I subtract differently, I was able to share how I was taught to subtract, while Mrs. Whitener demonstrated her approach in class. “I liked that you helped me answer hard questions, like the word problems. It helped to switch teachers because it showed her a different method of subtracting.” Since Mrs. Whitener and I subtract differently, I was able to share how I was taught to subtract, while Mrs. Whitener demonstrated her approach in class. Afterward, I asked her how seeing two different people solve problems on the board helped her understand subtraction more easily. She said, “It helped me because Mrs. Whitener was going deeper into the problem, and Miss Hess did it differently.” When I inquired about what I did differently, she explained, “You included us all the way through the problem.” This collaborative approach seemed to make a significant impact on her understanding, allowing her to grasp the concepts from multiple perspectives. I also noticed that she became more confident in asking questions, something that can sometimes be challenging for students. Her willingness to share her thoughts during our discussions indicates that she feels more supported in her learning environment. This dynamic is crucial, as it fosters a sense of community in the classroom where students can learn from one another.  **Interviewer Reflection Commentary: How do teacher and student responses above inform how you want to teach in the future?**  The teacher and student responses highlight the effectiveness of diverse teaching methods and collaborative learning in mathematics. In the future, I want to incorporate multiple approaches to problem-solving, recognizing that students benefit from seeing concepts explained in various ways. As noted by Van de Walle et al. (2019), “Students learn better when they have opportunities to explore mathematical concepts from multiple perspectives.” By demonstrating different strategies, like those used by myself and Mrs. Whitener, I can help students develop a deeper understanding of subtraction, particularly when dealing with zeros. fostering a classroom environment where students feel comfortable sharing their thought processes and asking questions is essential. The positive response from the student indicates that engagement and collaboration can significantly enhance comprehension. I plan to implement more group work and discussions to encourage this dynamic, allowing students to learn from each other. In my future I will prioritize differentiated instruction, offering targeted support for those who may struggle with certain concepts. This personalized approach ensures that all students have access to learning opportunities tailored to their needs. Ultimately, my goal is to create a supportive and flexible learning environment that values diverse methods and encourages active participation in mathematics. | | | | | |
| **Component 3: Academic Vocabulary**  Given the language function and learning task identified in the standard and objective for this lesson plan listed in part 2, describe the academic vocabulary inferred from standards and objectives and the academic vocabulary actually used for this lesson. Differences between inferred and used academic vocabulary suggest concepts students already know, concepts they may be struggling with, and concepts that may be new to them. | | | | | |
| **General Academic Vocabulary That Could Be Used to Build the Mathematics Concept of subtraction**  **Unit**: Number and Operations in Base Ten—subtract whole numbers  **Borrowing**: to rearrange or take a value from one place to another to complete the subtraction problem  **Remain**: describes what is left over after some part was taken away  **Expression**: a mathematical phrase that can represent numbers and operations, such as part of an equation or after the equal sign  **Equal sign**: the symbol showing that two expressions in an equation are equivalent sch as 100-70=30 as 30+70=100 and 70+30=100 | | | | | **Mathematics Vocabulary Specific to subtraction that Could Be Used to Build the Mathematics Concept of subtracting with zeros**  Re- grouping/borrowing  Subtraction  Addition  Take away  Difference  Less than |
| **General Academic Vocabulary That Was Used to Build the Concepts of Subtracting with Zeros**  **Borrowing**: to rearrange or take a value from one place to another to complete the subtraction problem  **Place** **value**: the foundational concept in mathematics that defines the value of each digit in a number based on its position (ones, tens, hundreds, thousands, etc.) | | | | | **Mathematics Vocabulary Specific to the Concept of Subtracting with Zeros That Was Used**  **Subtraction**  **Adding**  **Difference**  **Take away** |

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| **Component 4: Assessment Plan** | |
| Planned Objective: The student can Subtract With zeros using whole numbers  Actual Objective: The student can Subtract With zeros using whole numbers | One or Two Assessment Methods(s) Embedded in the Cooperating Teacher’s Chosen Assessment Instrument(s). Actual assessment Instrument(s) Are Described in the Cell Below:  \_X\_\_Worksheet (see example attached)  \_\_\_Test (see example attached)  \_\_\_Observation Checklist (see example attached)  \_\_\_Other (see descriptions below) |
| **Description of assessment method #1 and student work.**  Using the worksheet assessment approach, my cooperating teacher and I were able to observe the extent to which the children understood the idea of subtracting zeros from whole numbers. Observing the student I was evaluating as I moved around the classroom. I noticed that she frequently understands that a number remains the same when a zero is subtracted from it. For instance, she can quickly recognize that 5 remains after subtracting 0 from 5 (5 - 0). However, she can find place value or bigger numbers difficult to understand. For example, when faced with situations such as 50 - 0, she may overthink or become confused by the zero, even though the answer is still 50. She appeared to be really engaged with the worksheet and ensured her ability to subtract. I could tell who was having trouble with this math concept and who was grasping their homework. When she reached the final four questions—where the subtraction problems were vertical rather than horizontal—that's the only time I recognized she was confused. | |
| Results of this method of assessment:  **What general patterns of learning did you observe as you evaluated assessment products with your cooperating teacher? What exceptional patterns of learning did you observe?** \*\*\*  General patterns of learning I observed with my cooperating teacher was the confusion of using the ones, tens, hundreds, thousands place and so on when subtracting. Using place value is meant to make this concept easier for them but I am afraid not everyone had a full grasp on their place value and without enough knowledge of their place value system, subtracting with zeros could be even more confusing. General patterns I observed when evaluating their assessments would be the misconceptions of subtraction zeros and the concept of regrouping/ borrowing. Students may skip steps in their thinking or misalign digits when writing out the subtraction, particularly when working with multi-digit numbers. The misalignment can cause confusion. The general patterns show that most students grasp the basic idea that subtracting zero leaves a number unchanged, with some challenges around alignment and place value in more complex problems. Exceptional patterns include a deeper understanding of the why behind this rule, metacognitive skills, and applying the concept in real-world scenarios. Higher-order patterns are often seen in students who are developing advanced mathematical thinking skills and can articulate their reasoning effectively. In the classroom, fostering an environment that encourages questioning, exploration, and discussion can further nurture these skills. Teachers can support this development by providing challenging tasks that require students to think critically and creatively.  Additionally, encouraging collaborative learning experiences allows students to share and refine their ideas, benefiting from diverse perspectives. Encouraging collaborative learning environments where students can discuss and share their understanding of subtraction concepts with peers can further enhance their comprehension. Incorporating games and interactive activities that involve subtraction can make learning more engaging and enjoyable, allowing students to explore concepts in a fun and dynamic way. Additionally, integrating technology, such as educational software or apps, can provide interactive experiences that reinforce the idea that subtracting zero maintains a number's identity. In evaluating assessment products with my cooperating teacher, I observed several general and exceptional patterns of learning. A general pattern was that most students demonstrated a solid understanding of subtraction involving zeros, especially when they verbalized their thought processes during group discussions. For example, many students successfully solved problems like 500 - 300, clearly showing their grasp of the borrowing process. An exceptional pattern emerged among a few students who initially struggled but made significant progress by using visual aids like place value charts. One student transformed from confusion about borrowing to confidently solving complex subtraction problems after engaging with these models. Van De Walle mentions “The practice of *scaffolding,* often associated with sociocultural theory, is based on the idea that a task outside This fosters a supportive learning environment that can significantly enhance comprehension. By recognizing these patterns, we can adapt our instructional strategies to better meet the diverse needs of our students, ultimately improving their learning outcomes. Finally, providing real-world scenarios, such as budgeting exercises or measuring ingredients for a recipe, can help students see the relevance of subtraction in everyday life, solidifying their understanding and appreciation of the concept. | |
| **Cooperating Teacher Interview Question**  **What different ways of did you see your students demonstrate their learning of your objective today? How do you get to value these different ways of learning through the grades your school asks you to assign to each student? To what extent do you think your students agree with the way your school values learning differences through its grading system? Why?**  “I was able to see my students demonstrate their learning to me in many different ways. The first way was by raising their hands and participating in the whole group lesson. I also was able to see this while I was walking around the classroom and checking their workbooks to see if they were borrowing correctly. Another way I was able to see them demonstrate their learning was in small group rotations. During this time, the students were working independently while Miss Hess and I were able to assist when needed. Although very little needed our help because they were grasping this concept well. Our school district does standards-based grading, and we even break things up by sub standards. This way it is easier for the parents to see what exact skill their child is possibly struggling or doing well with. By doing this, it helped me see that many students have strengths and weaknesses in different areas. So instead of just saying a student is getting a B in math, I can see what exactly they need help with. It has taught me that people can have strengths and weaknesses within a certain subject and that has taught me to value that students learn differently and have different things they are good at. Sadly, I do not think our students think about grades much but that is because there is a disconnect with the parents caring about grades. Our district has seen and noticed this lack of connection, so they are trying new things like mailing the report cards home to the parents. We are hoping this will help parents see their child's needs and also want to help.”  **Diverse Student Interview Question**  **What did I say or do during the lesson that made the most sense to you? Why?**  The student said that she liked when we both taught the lesson so she can see us doing the subtraction problem and have different ways of asking questions to the class. I asked if she could give me an example of what she is talking about and she mentioned that she liked when we both took turns when we were in a whole class setting before rotations. I asked what her favorite part of the lesson was, and she said that she really liked that I was teaching the lesson with Mrs. Whitener and practicing becoming a teacher. She really understands the concept of borrowing. My teacher has a fun saying, "Bigger on bottom, better borrow!" So, when you come across a zero on the top, you've got to go over to your neighbor and ask for a ten! But if the lights are off and no one's home, it’s a game of finding a neighbor who will let you borrow from them.  **Interviewer Reflection Commentary: How do teacher and student responses above inform how you want to teach in the future?**  The teacher and student responses inform me how I plan to teach in the future in many ways. I would love to incorporate so many things I have learned in my seven weeks at this placement. I could not have gotten a better first observation. She is supportive, energetic, fun, interactive, dedicated and so many more things that students need in an elementary classroom. I would love to be my absolute best for my students. My teacher mentioned in response to one of the interview questions how. My cooperating teacher has taught me to be serious and get the standards done and then just have fun with the subject. I have learned that if students are struggling with any topic, math in particular you can act certain scenarios out to help students understanding. From my student’s response I have learned that students know more than you think they do. She knows that I was going to be co-teaching with mrs. whitener and she enjoyed seeing multiple ways to solve a subtraction problem. I would love to make sure that I incorporate multiple ways of solving math problems because as students see multiple ways to solve problems this builds their number sense and also helps students solve problems in ways that make sense to them. | |

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| **Component #5: Teaching and Learning Sequence** | |
| Lesson Events | Why was this event included? What questions were asked? What explanations and examples were given? |
| **Whole group:** start the lesson by going over a couple of vocabulary words and then work on a couple of math problems as a whole group. Once they’re ready and understand the concept they will then work in rotations. | **As Simonds mentions on page 185 “Many Hispanics and Asian cultures expect students to learn by listening, observing, and imitating” (Simonds 2011) A whole group setting provides an opportunity for collaborative learning, where students can help each other understand complex concepts and work through challenging problems together. By discussing their thought processes and solutions, students can gain new perspectives and deepen their understanding of the material. Additionally, the instructor can offer guidance and support, ensuring that any misunderstandings are addressed promptly. Overall, this event aims to create a dynamic and interactive learning environment that benefits all participants** |
| **Small group:** students working on the lesson independently but with support from the teacher(s**)** | **By allowing students to tackle problems independently while still being available for support, we created a safe space for exploration and growth. This encourages them to take risks in their learning, knowing they have a safety net when needed. By facilitating open dialogue and personalized guidance, we not only promote academic success but also nurture a sense of belonging and community within the classroom. As Simonds mentions on page 126, “The more opportunities we provide students to “try out” behavior in small groups and to internalize the mirrored reactions of others to these behaviors” (Simonds 2011)** |
| **Technology group**: technology program called Reflex- work on add, sub, and multiplication. Creates a fun environment to learn and build number sense. | **Students engage with interactive games and challenges that adapt to their skill levels, ensuring that learning remains engaging and appropriately challenging. Reflex's colorful graphics and instant feedback keep students motivated, while progress tracking allows teachers and parents to monitor improvement and provide support where needed. In this dynamic and encouraging setting, children not only develop essential math skills but also gain confidence in their abilities, fostering a positive attitude towards learning that can last a lifetime. According to *Elementary and Middle School Mathematics: Teaching Developmentally* by Van de Walle et al., using technology and interactive tools can enhance student engagement and most of the time you can the students could receive immediate feedback.** |
| **Independent group:** Building on what they learned from the lesson they each receive a worksheet to work on practice problems. Not homework. | **The worksheet is designed to reinforce the key concepts covered in the lesson, allowing students to apply their new knowledge in a practical way. Each problem is carefully made to challenge their understanding and encourage critical thinking. The practice problems vary in difficulty, from simple exercises that build foundational skills to more complex scenarios that require creative problem-solving. “This Zone of Proximal Development (ZPD) can become assessable if it is carefully structured. For concepts completely new to students, the learning requires more structure or assistance, including the use of tools like manipulatives” (Van de Walle pg. 26)This variety keeps the students engaged and motivated, as they can see their progress and feel a sense of accomplishment with each correct answer.** |

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| Cooperating Teacher Interview Question  **Do you think the students are ready to move onto the next topic? Please explain why.**  Initial and Elaborated Response:  She said “Absolutely! The students were doing well with this lesson in a small group setting and showed me that they understood with their exit ticket (worksheet attached) that they worked on independently. I think some students are ready to move on to the next topic because they've shown a good understanding of the material through their classwork and discussions. However, a few still seem a bit unsure, especially with some of the more challenging concepts. It might be helpful to review those areas a bit more before we dive into something new, so everyone feels confident moving forward." Then I asked what she could do as a teacher to review. She said she could do some more group work or some sort of interactive quiz like Kahoot. By using multiple methods I think she could give all students a full grasp on the topic of subtracting zeros.  Diverse Student Interview Question  **How does subtracting make you feel?**  I asked her how subtraction makes her feel, and she responded positively since she said it makes her feel good. However, when I asked if she ever feels frustrated with it, she mentioned that she sometimes struggles with word problems. She mentioned that she gets confused about what is being asked and often needs assistance reading the questions aloud. This leads to feelings of embarrassment and fear when she cannot answer some questions independently. She expressed her preference for working alone and with confidence, and she feels a rush of excitement when she arrives at the correct answers. Additionally, she takes pride in her ability to understand subtraction and feels happy when she solves problems that previously seemed challenging. Most importantly, she was reminded that seeking help is a strength, not a weakness. By working with others, she can gain new perspectives and different ways of doing math problems, which grows her number sense. With these new strategies and a positive mindset, she felt more confident about word problems subtraction and math as a whole. It was clear that the combination of different teaching styles not only clarified the methods but also encouraged her to think critically about the problem-solving process. By seeing the same problem tackled in distinct ways, she was able to connect the dots and find a strategy that worked best for her.  **Interviewer Reflection Commentary: How do teacher and student responses above inform how you want to teach in the future?**  The student’s response makes me feel happy and excited that she loves to subtract and how it is easy for her. I am excited to test out certain settings in the classroom and find out what works best for certain students and what doesn’t and how I plan to go from there. The teacher and student responses emphasize the value of diverse teaching methods and active engagement in learning, which will significantly inform my future teaching practices. I want to incorporate multiple strategies for solving problems, as the student benefited from seeing different methods of subtraction. Presenting various approaches allows students to find the one that resonates with them. Additionally, the student's appreciation for being included throughout the problem-solving process highlights the importance of interactive teaching. I aim to create opportunities for all students to participate, ask questions, and share their thinking. Focusing on deeper exploration of concepts is also crucial, as indicated by the student’s reference to Mrs. Whitener’s approach. Facilitating discussions that delve into the "why" behind methods can enhance understanding. I plan to encourage peer collaboration by implementing more group activities where students can share their strategies and learn from one another. Lastly, prioritizing reflective feedback from my students about what works for them will help me refine my teaching methods and better meet their needs. By integrating these elements, I hope to create a more inclusive and effective learning environment that supports all students in developing their mathematical skills and confidence. |
| **References:** Chapters and page numbers in course texts needed for this field assignment. APA format required. |
| Simonds, C., & Cooper, P. J. (2011). *Communication for the classroom teacher* (9th ed.).  Boston, MA: Allyn & Bacon. See pages…126 and 185  Van de Walle, J. A., Karp, K., Bay-Williams, J. M., Wray, J. A., & Todd Brown, E. (2019). *Elementary and Middle School Mathematics: Teaching Developmentally* (10th ed.). Pearson. See pages…26-28  [Subtraction worksheet.pdf](file:///Users/oliviahess/Documents/Language%20and%20Communication/Subtraction%20worksheet.pdf) |
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