Amelia Harkenrider

Plan to Teach: October 25, 2022

Content Area: Math

Grade Level: First Grade

Topic: Represent and solve problems involving addition and subtraction.

Time: Approximately 30 minutes

Into/hook/objectives- 3 minutes

I Do Section- 10 minutes

We Do Section- 7.5 minutes

I Do Section- 7.5 minutes

Close/objectives- 2 minutes

Standards:

- **Mathematical Practice**
    - CCK-12.MP.1: Make sense of problems and persevere in solving them.
    - CCK-12.MP.2: Reason abstractly and quantitatively.
    - CCK-12.MP.4: Model with mathematics.
    - CCK-12.MP.6: Attend to precision.
    - CCK-12.MP.7: Look for and make use of structure.
- **Mathematical Content**
    - CCSS.MATH.CONTENT.1.OA.A.1:Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting

together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Thinking about the Learning

Objective:

The following lesson is centered around the ability to listen to or read a story problem and find the important information needed to form and solve an equation. Mrs. Foerch asked me to write a lesson that focuses on subtraction within 20, as the students need extra support with it. Therefore, I want students to be able to hear or read a story problem and have the ability to form and solve the subtraction equation. In addition, I want students to have the ability to translate numbers from the story problem into the correct sequence in an equation. The standard that Mrs. Foerch suggested that I center the lesson around incorporates the necessity of having students be able to model or visualize their academic thinking. To meet this standard fully, I want the students to also be able to make a circle drawing to represent their equations. Lastly, I want students to be able to visualize how an unknown number is represented in an equation and be able to make a math mountain for their equation, and begin to notice the relationship between numbers. Students will start to learn how to solve subtraction problems in various ways using what they know to solve for that unknown number.

"I CAN Statements":

- I CAN write a subtraction equation based on a story problem.
- I CAN use a circle drawing to show my thinking.
- I CAN visualize how an unknown number is represented in an equation.

- I CAN model how numbers work together using a Math Mountain.

Rationale:

The standard and lesson are important for students to learn how writing and solving subtraction equations and making circle drawings help them to understand subtraction. These concepts will build a foundation for more challenging mathematics in the future. It is necessary to understand both addition and subtraction to continue growing in math. Students must be able to identify key elements of story problems. Not only will this help them to better understand the relationship between numbers and recognize the correct sequence of elements from a reading or listening activity, but it will also strengthen their literacy skills (integrated curriculum) because they will have to interpret and understand key vocabulary words. Developing these skills is challenging because they are combining two content areas. To build even further on an integrated lesson, it would be possible to create story problems that incorporate social studies content that the class has recently studied. It is necessary to begin by modeling how to form and solve a subtraction equation for the students. This modeling will then be followed by completing an equation as a whole class. Lastly, the students will complete independent work with teacher support. To support students best, it is important, to begin with, simpler story problems to introduce students to the math vocabulary (subtraction/addition, equals, etc.).

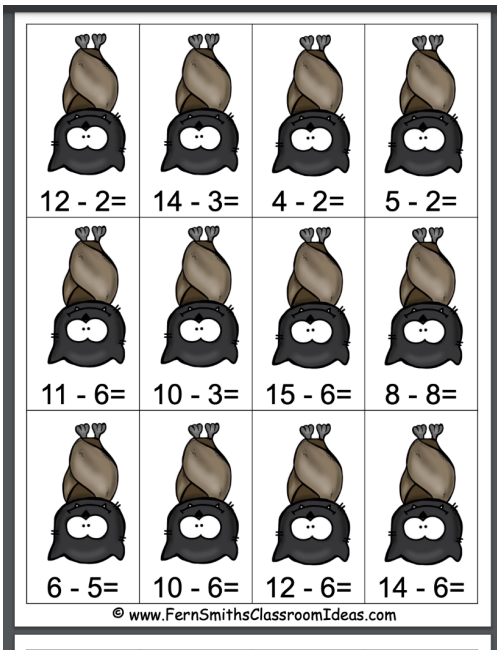
For this specific lesson, the focus will be on subtraction, so there will be varied subtraction phrases that the students will need to identify to know the problem is subtraction. The students will be learning to associate these phrases with subtraction and hopefully be able to differentiate these phrases from the addition phrases they have learned. Incorporating the circle drawings and math mountains will allow students to build their number sense, which will allow them to progress into multiplication and division. This lesson will fit in with what the students

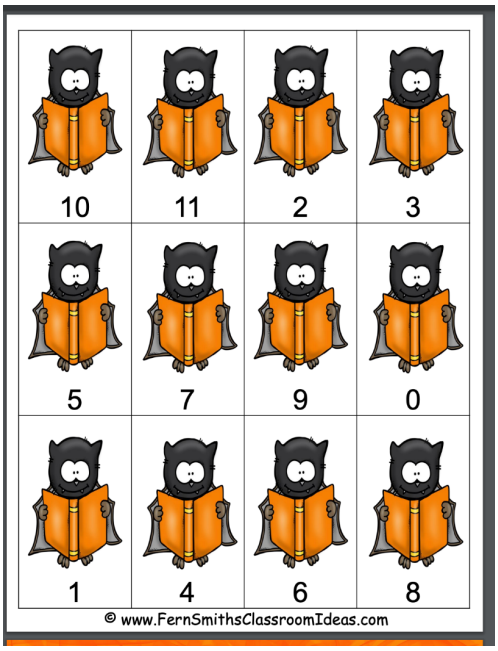
have learned before this lesson because they have studied subtraction equations before, but the story problem addition will allow the students to become familiar with more subtraction vocabulary. The students will also be learning to create the equations on their own and proceed to solve them.

Pre-assessment:

I will conduct my pre-assessment the week before I introduce the lesson. For my pre-assessment, I will ask students to find a table partner because they will be asked to play a Halloween card-matching game. The cards will all be flipped over, and on some of the cards, there will be subtraction problems with an unknown answer, while others will have the solution. As the students flip over the cards they must match the equations with the solution card. The students will need to solve the equation to know which card they need to match the equation card with. As the students play the math game, I will walk around the classroom and observe whether the students recognize the problem as a subtraction equation and whether they can solve subtraction problems within 20, as these skills are necessary to move forward with the lesson. If the students are unfamiliar with these concepts, I will know I need to review them before moving forward. I would have subtraction problems prepared and be ready to model circle drawings and math mountains again. I will not expect the students to be able to solve the subtraction problems quickly, and I expect that some of the students will not be able to complete a subtraction problem. However, this math pre-assessment will give me an idea of how I teach the story problem lesson, and what I need to review.

Example:





Summative Assessment:

Mrs. Foerch has workbooks that the students complete at the end of the lesson. So, for the summative assessment, I plan to have the students complete page 77 in their workbooks. As they work on the worksheet, I will walk around and observe which students are struggling and which students seem to understand the concepts well. Once they complete the worksheet, I will have them turn it in. Once they leave for recess, I will grade the worksheets to see who was successful and understands the concepts and who needs more support. I will also take note of which students showed their thinking through circle drawings and math mountains. In addition, I will be checking to see if the students put the numbers from the story problem in the right location in their equation. After completing the grading, I will see if there are any general areas in which the whole class did not understand so that I know if I need to reteach any concepts or explain a

specific problem to the class. In addition, I will be checking to see if the students put the numbers from the story problem in the right location in their equation.

Thinking about the Lesson

Subtraction and Addition Story Problems Presentation

Connections:

Before the lesson begins, I will make connections to their previous learning of addition story problems. I will ask the students to share out what they think makes a good story *(plot, characters, location).* After a short discussion, I will ask whether they have solved a story problem in math before. If they have, I will ask them to share out what a story problem might include. I would point out that when we read a story problem, we must identify the important vocabulary words that will help us find the solution. Then, I will ask the students to use their prior understanding of the differences between addition and subtraction to share out how they believe addition and subtraction story problems will be different. I will then explain that we will be reading/listening to story problems and then generating equations based on the information given to solve a math problem. I am hopeful that they will have enough understanding of addition/subtraction that they will have a basic understanding of what an equation should look like. If I see that they need to review the difference between addition and subtraction, I will do that here. Between the pre-assessment and this section, I hope to know what support is needed. It is possible that when we take away a part from a number, it is called subtraction, and when we add one part to a number, that is called addition. As I review, I would also cover the symbols that accompany addition (+) and subtraction (-). Students will have to recall their knowledge of subtraction, addition, and writing equations. They have solved addition and subtraction equations

before, however, now they will be doing story problems and modeling their thinking. Connecting back to our discussion on recognizing the key details given in a story problem, students will need to recall the important aspects that go into an equation (equal sign and specific symbol).

Introduction:

For my entry event and introduction, I want to get the students engaged in the material, so I want to act out a story problem. For example, I will set up a grocery store setting. I will bring fall-fun erasers that the store will be selling. There will be seven erasers in the store. I will say out loud, “Look at these 7 erasers that the store has! I would like to buy some of them. I want to take three of them from the store!” I will then take three erasers from the seven displayed. I will then ask the class to shout out how many erasers the store has left. They will then say that there are four erasers left! After this, I will ask the class if they knew that I could write an equation to represent what I just modeled. Then, I will model how I would write an equation to fit the grocery store scenario. I would point out that it was a subtraction equation, and I know this from the stated “take from” phrase. I will then explain to the students what the objectives of today's lesson are and I would go over the I CAN statement with the students. I will cover why the students will be learning the content and how they can apply it to real life. When students understand why they are learning information and how they can use the information in their daily lives, they are more motivated and engaged in the material. Students also deserve to know why they are learning certain concepts.

Task:

For this lesson, I plan to conduct a gradual release method of instruction because that is what my mentor teacher recommended worked best for her students thus far. There will be three parts to this lesson, which are “I Do”, “We Do”, and “You Do”. Students will have the strategy

modeled to them by me. They will then have the opportunity to complete a story problem along with me. Finally, they will independently complete a story problem, so the students will have the opportunity to fully observe the expectations and concepts from the teacher, as well as have the time to practice independently from me (in pairs) to test their ability to meet the lesson's objectives.

During the **"I do"** section, I will conduct a mini-lesson covering the topic of forming subtraction equations based on subtraction story problems. I will be at the front of the classroom and the students will be at their table groups. I will think aloud so that the students can follow along as I model what they are learning. I will continue with the presentation that contained the lesson objectives. I will display a subtraction story problem with the projector so that the entire class can see it. Next, I will walk through how to read and write an equation. To begin, I will read aloud the story problem. I will say, "There were 9 sloths sleeping in a tree. Then, 4 the sloths crawled away. There are now 5 sloths sleeping in the tree." For the first part of the "I Do", I will model a subtraction equation that has already been solved. After I read the story problem one time, I will think aloud to the class using I statements about what I think the important parts of the story problem are. I will say, "Hmm… what is important in this problem? I notice that there are 9 sloths to begin with. I am going to circle the 9." I will then circle the 9 in the first sentence on the screen. Then, I will say, "Next, I see that there are 4 sloths that crawl away. I think I will circle 4 and the words crawl away." After I circle these details, I will continue, "Finally, I see that there are 5 sloths still sleeping in the tree. I will circle the 5." After I have identified all of the important items in the story problem I will begin to build my equation. I will say, "So I know that I begin with 9, so I am going to write that on the board." I will write 9 on the board at the front of the room. "Then, I see 4 sloths and I see that they <u>crawl away."</u> I will highlight the words <u>crawl</u>

away and tell the students that these words indicate that something is being taken away. When a part of a whole is removed, it means that we have a subtraction problem. “Now that I see that we have a subtraction problem, I am going to write the symbol for subtraction (-) after the 9 and write a 4 after the (-).” Finally, I will tell the class that I see that 5 sloths are left, meaning that the previous equation equals 5. “I am going to write = after the 4 and follow the = with the 5. So, my entire equation to represent the story problem is 9-4=5.” Next, I will display another story problem in which the solution is unknown. I will read the story problem aloud, “Molly buys 13 plants for her grandmother. However, Molly’s mother takes away 6 of the plants for herself. How many plants does Molly have to give to her grandmother?” I will recognize and think aloud about how this story problem does not tell me how many plants are left. I will proceed to model this story problem as I did the last one. “I need to find the important aspects of this story problem. I see that there were originally 13 plants that Molly bought. I am going to circle the 13. I also see that Molly’s mom took 6 of the plants for herself. I am going to circle 6 and takes away. I know that the words take away signal a subtraction problem, so the number of plants remaining will be smaller than 13. So, I am going to write 13 first because that is the starting number. I am then going to signal a subtraction equation with (-). After (-), I am going to write 6 because that is how many plants that Molly’s mom takes away. However, now I have to solve this subtraction equation.” This is where I will demonstrate and explain the circle drawing and how I can use it to solve this equation. “Circle drawings are quick and easy ways to represent the numbers from the problem, so that I can quickly cross them out and solve the subtraction equation.” I will continue by saying “I am going to first draw 13 circles because that is how many plants Molly bought for her grandmother. Now, because Molly’s mom took away 6 plants for herself, I am going to cross out 6 of the circles to represent that those six plants are not there anymore. I think I have solved

the equation! After I crossed out six of the circles I can see that 7 circles are not crossed out. That is how many plants are left! So I have 7 plants left!" I will then complete the equation on the board so that the students see the equation 13 - 6 = 7. I will then proceed to represent the equation and circle drawing with a math mountain. I will draw my mountain and write 13 at the top because that is how many plants Molly started with. I will then write 6 on the left side and 7 on the right side of the mountain and say, "Oh, 6 and 7 added together equal 13, which is what is at the top of the mountain! I must be correct based on my equation, circle drawing, and math mountain! I know I just covered a lot of material, but how are we feeling? Now let's try it together/review (based on thumb response)!"

The next part of the lesson is the **"We Do"** portion. The students will remain at their table desks and have their materials ready. I will display the next story problem on the board, and I will read it aloud to the students as they read along I will say, "In the sky, there were 18 clouds. 7 of the clouds blew away. How many clouds were left?" After I read the story problem, I will ask for volunteers to tell me the important aspects of the problem. As they reveal which problems to focus on, I will circle them on the displayed problem. For example, I will call on a student and ask "What is the starting number?" Then, the student will have to respond with the number. I may even ask them why they believe that is the correct response. As we work through each part of the story problem, I will be also walking around to ensure that students are following along on their whiteboards. Once we get to the part of the circle drawing, I will ask a student to explain to me why they drew their circle drawing the way they did. If there is enough time, I will ask students to come up to the front to draw their circle drawings and explain how and why they made the decisions that they did. Throughout the lesson, I will be asking students why they answered that way or how they came to that conclusion in order to engage them in critical

thinking. If a student makes any mistakes I will ask, “Hmm… does that make sense?” I want to see if they can figure it out. If not, I will call on another student to help out. We will keep practicing until I feel the students are starting to grasp the concepts. I will continue to be guiding the questions and supporting the students who need extra support. I am hopeful that the students will be active participants and will be challenged to critically think as they model their thinking.

The last section of the lesson is the **“You Do”** portion. I will ask the students to grab one partner. I know some students will struggle with this lesson, so before the summative assessment, I want them to work with a partner. There are a lot of challenging concepts that are covered, so I am not expecting all of the students to grasp the content right away. I plan to walk around and help the students who will need assistance and guide them as I did in the “We Do” section. The students who demonstrate an ability to interpret and solve subtraction equations will be able to move at a faster speed, but the students who need extra help will also be able to work at a slower pace. I can still read the problems out loud if the struggling students need this support. After I give them some time to work, I will review each problem. I will do this in the remaining time, so some students might get further in the problem sets than others, but we will review them as a whole class. The remaining time is reserved for the summative assessment worksheet which the students will turn in once they complete it.

Closure:

I want to end this lesson by reviewing the material that we covered during class. I will begin by thanking the students for working so hard and for being great mathematicians. I will review the objectives that we looked at before the lesson began, and I will cover what the students have accomplished during their daily math time. I will show them how they have learned how to write subtraction equations based on a story problem and learned how to model

their thinking through the use of circle drawings and math mountains. As I am reviewing the lesson, I will have the slide with our objectives projected so that all of the students can follow along. This will give them a visual aid to understand what they have accomplished and I will encourage them to be proud of themselves. I will end by saying that they will continue to build their skills in math using the techniques that we learned during this lesson.

Student Thinking:

Students must be able to critically think and show their thinking. One requirement of this lesson will be that students visually model this thinking through circle drawings and math mountains. I will also be asking the students questions based on the responses they give me to probe their thinking and motivate them to engage in this critical thinking as they are asked to explain their reasoning. Through both the circle drawings/math mountains and the math discussion, students will think deeply about the content. I believe that there will be times when I will have to redirect students' thinking because it is incorrect, but I also think there will be opportunities for the students to have the right idea and to be able to dig deeper into the concept. In both cases, students will have to use deeper thinking in order to either figure out their mistake and correct it or deepen their comprehension of the concept. These aspects of the lesson increase the level of rigor as the students navigate the how and the why to solving subtraction equations.

Formative Assessment:

Throughout the lesson. I will be formatively assessing the students in various ways. One formative assessment I will use is before moving onto the next section of the lesson, I will ask students to give me a thumbs down, to the side, or up based on their level of comfort with the material. I will observe which students seem to understand the material and which students need more modeling or practice. Another formative assessment I will use is by reading their body

language during the “I Do”, “We Do”, and “You Do” sections to see if there is any observable confusion or frustration with the content or the speed of the lesson. Another formative assessment I will use during the “We Do” and “You Do” sections is to ask probing questions and observe which students answer and demonstrate the ability to write subtraction equations. I will also formatively assess the students during the “We Do” and “You Do” sections of the lesson by walking around and observing the students’ work and if they demonstrate the ability to interpret subtraction story problems. I will question their thinking and observe which students are able to articulate their thinking. I will keep notes on the students who can and cannot explain or demonstrate the ability to interpret the story problems. Through these formative assessments I will know whether I need to review certain parts of the lesson before moving on. Before the “You Do” section, especially, if the majority of the class has their thumbs down, I will know I need to keep working through the content with them. If I only see a few thumbs down, we will move on, but I will be ready to provide support for the students who had their thumbs down.

Accommodations:

I have a couple of students in the class, Reece, Ben, and Amelia, who will need extra support during the lesson. Reece needs more visual support to remain engaged and to complete the assignment, so I will have manipulatives ready for Reece to use as she works independently. I will also have manipulatives ready for all of the students so that Reece does not feel isolated. I will also be observing and ready to assist Reece by highlighting the section she needs to complete in order to keep her focused on her work. Ben struggles to remain focused on an assignment and often begins to distract other students. I believe that having manipulatives ready will engage Ben in the content long enough that he will be able to complete his work. Amelia needs behavior support, so I might need to allow her to take a moment in the calm corner, or

notify her that her work will have to be completed during recess time. Mrs. Foerch has also realized that Amelia works well during the one-on-one math time, so if Amelia refuses to complete her assignment, I will talk to Mrs. Foerch and she will be able to assist me in instructing Amelia. If students are given pieces that they can physically remove parts or add parts, they will be able to visualize how many are left at the end.

In addition, I will read the story problem out loud as another accommodation. Students who are challenged by their reading comprehension will be supported through teacher-read math problems because there will be less stress and they will be able to divert their energy into understanding the math problem. All the numbers I will be using will be 1-20. However, I know that there are some students in the class, like Nora and Bernadette, who need an added challenge to their assignments. I am planning to have prepared mathematical equations that these students will have to write a story problem for. An example of this would be to give both of them the following equation: 16 - 9 = 7. The girls would then have to write their own story problem based on the equation. This will provide these students with an extra challenge to keep them engaged.

Technology:

I will use some technology for my lesson. One piece of technology that I will be using is the projector to show my Presentation. The presentation will be Google Slides that include the objectives, I CAN statements, and story problems. Having the projector present the slides will allow all of the students to view the story problems clearly. They will also be able to reference back to the problem as they work, which will prevent confusion and distraction because the problems will be consistently shown while the students work.

Logistics:

Before I begin my lesson, I will designate a signal to notify students to quiet down. Mrs. Foerch recommended that this would be a helpful way to manage the class. The students also are aware of the expectations that exist during a lesson, so I will review these with them. I want to allow the students to move around for a moment before the lesson, so I will run through one round of "Head, shoulders, knees, and toes". Then, the students will be instructed to get the needed materials out and to put everything else away. I will tell them I will know they are ready to move on when they have their thumb up. If the students are coming from another location or another lesson, this will allow for a smooth transition. At the end of the lesson, I will also have to provide them with directions on where to turn in their worksheet and where to put all of their materials. The students should be comfortable with these expectations, as they are consistent with their daily tasks.

I will need some other materials besides my presentation. The materials I will need are a whiteboard and whiteboard markers for the "I Do" section. The whiteboard will allow me to model the solution and my thinking so that all of the students can see it. In addition, I will need a computer and projector, so that I can use my presentation. The students will need their workbooks, whiteboards, markers, and erasers that are labeled with their class numbers. I will also have base-ten blocks and other manipulatives ready to demonstrate more story problems if students need extra assistance.