First Grade Math Instructional Design Plan

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Rationale

There is a problem in the current district that I serve in. The math curriculum is not as rigorous as the Common Core, and there are a lot of learning gaps that students suffer from. This means they are not prepared for second grade math, and subsequently third and fourth grade, and so on. Foundational math skills are taught in the first grade, and if students do not develop a sound understanding of these skills than they will likely struggle in subsequent math classes. A uniform math curriculum that meets the rigor of the Common Core, as well as the needs of the students needs to be developed in order for our students to become successful mathematicians. "Mathematics achievement is a key educational concern in the United States. Competence in mathematics is critical to the workforce in STEM (science, technology, engineering, and mathematics) disciplines and to international leadership" (Jordan, Glutting, & Ramineni, C, 2010).

Understanding first grade math is essential to success in further grades, as well as success into adulthood. First grade is when students begin to lay the foundation of addition and subtraction. First grade is when students learn the basics of addition, using the "part, part, whole" model, and understanding that the two addends are the parts, and when they are put together they become a whole. This is also a time when students develop a true understanding of place value. If students understand how to manipulate a number's place value, they will have much success going forward in math. According to Roger Howe, there are three pillars to math and early numeracy, and these pillars are essential to starting off on the right path with arithmetic. The first pillar is, "a robust understanding of the operations of addition and subtraction"(Howe, 2012, p.1). The second pillar, as described by Howe is "an approach to arithmetic computation that intertwines place value with the addition/subtraction facts" (2012, p.1). The third pillar is

"making connections between counting number and measurement number"(Howe, 2012, p.1). All three of these pillars describe the foundation that is necessary to be successful in operational math.

Students also need to be able to understand, and analyze the information that is set forth. Students should understand why they are adding, and how the numbers can come together. According to Nunes, Bryant, Barros, & Sylva, (2012), students need to understand the relationship between the different qualities of the problems. This is the foundation for understanding "part, part, whole" in the first steps of addition.

The purpose of this unit is to lay the foundation of basic addition and subtraction skills, and to prepare students for more challenging mathematical concepts in the future. The course has the expected outcome of ninety percent of the students being proficient at two-digit addition and subtraction, with an introduction to basic triple digit addition and subtraction. Students will have the opportunities to explore these topics with manipulatives, and work cooperatively with peers and teachers.

<div align="center">**Unit Outcomes**</div>

Subunit One- The basics of single digit addition

CCSS.MATH.CONTENT.1.OA.C.6

➢ Students will be able to add and subtract within 20, demonstrating fluency for addition and subtraction within 10 with 90% accuracy. {application}

Subunit Two- Counting to 120, place value, and comparing numbers.

CCSS.MATH.CONTENT.1.NBT.A.1

➢ Students will be able to count, read, and write to 120 starting at any number with 90% accuracy. {application}

CCSS.MATH.CONTENT.1.NBT.B.2

> Students will be able to identify a number's place value, up to three digits, with 90% accuracy. {application, comprehension}

> Students will be able to identify how many tens a number is made of with 90% accuracy. {application, comprehension}

> Students will be able to explain that two digit numbers are made up of bundles of ten, and any number of ones. {application, comprehension}

> Students will be able to compare numbers using the greater than >, less than <, and equal to = signs with 90% accuracy. {application, comprehension}

Subunit Three- Adding and subtracting double digit numbers, ten more and ten less.

CCSS.MATH.CONTENT.1.NBT.C.4

> Students will be able to add and subtract within 120 using manipulates, or drawings with 90% accuracy.

  o Students will be able to add and subtract without regrouping with 90% accuracy. {application, comprehension}

  o Students will be able to add and subtract with regrouping with 90% accuracy. {application, comprehension}

  o Students will be able to describe or write the method they used to solve the problem, and explain their thinking. {synthesis}

> Students will be able to find ten more, or ten less of any number with 90% accuracy. {application, comprehension}

Pre-Assessment

The pre-assessment presented is going to focus on the learner outcome, "Students will be able to add and subtract without regrouping with 90% accuracy." It will specifically focus on single digit addition, which is the foundation of understanding double-digit addition. I made the pre-assessment myself, so I am aware of what skills are being tested. This type of pre-assessment will allow me to perform an itemized analysis, and evaluate what skills the students need to improve upon the most. For example, it will show if the students need help with adding one, or show if students struggle with numbers bigger than ten. An example would be 9+3, can the student successfully add up to a number larger than ten.

NAME:_____

SINGLE DIGIT ADDITION

1. 3+5=____

2. 4+1=____

3. 6+7=____

4. 5+5=____

5. 4+3=____

6. 6+6=____

7. 5+0=____

8. 2+5=____

9. 8+3=____

10. 3+0=____

11. 9+2=____

12. 5+4=____

13. 5+6=____

14. 3+9=____

Lessons

Lessons are meant to be taught on three consecutive days, and will take up to forty minutes for each lesson. See each lesson below for specific procedures, materials, activities, evaluation, and intervention strategies.

Lesson One- Introducing Addition

Unit Objective: Students can add and subtract within 20 with 90% accuracy.
Lesson Objective: Students can add within 20 with 90% accuracy.

Concept: Single digit addition- understanding "part, part, whole"

Time Frame: 40 minutes

Materials:
- ✓ Three part Styrofoam plates
- ✓ Two sided color chips
- ✓ Page 45 & 46 from Scott Foresman Series
- ✓ Plickers card
- ✓ Doc camera
- ✓ Mobile device

Vocabulary:
Part- a section of a whole
Whole- two numbers put together
Addition- when two numbers are put together to become one

Procedures
Introduction
Teacher will introduce the topic, "Students, today we will begin to learn about part, part, whole, and how we put numbers together. We will be using these paper plates and two sided chips. Our goal is to be able to add within 20."
Teacher will need to pass out chips and plates to each student. Each student will need one plate, and about 15 chips.
Teacher will need to remind students of rules while using math tools, such as: no throwing, no playing, share, and not to hit others with math materials.
Teacher will show the class the three parts of the plate, introducing the two small sections as the "parts" and the big section as the "whole".
Teacher will model how to put chips together. Teacher needs to put 3 yellow chips in one "part" and 2 red chips in the other "part". Teacher will ask student to count each part with them. Next, the teacher will move the parts, one at a time, to the "whole" section. Now, the teacher will show the students how all of the colored chips are in one section, and are now a whole. Now, the teacher will count out all of the chips to see how many there are altogether. After, it is the student's turn!

Guided Practice

Now the teacher will instruct students to put four yellow chips in one part, and two red chips in the other part on their plates. Have students give a silent thumbs up when they have their chips in place, do a quick scan of the room to ensure everyone has the correct number of chips. Ask the class, "what do you think we are going to do now?" Students should respond that we are going to make out parts whole. After response, join the two parts together and count out how many there are altogether. Students should respond with six altogether. Continue this model with three to five more examples.

Independent Practice

After students have shown some level of mastery with the paper plates, pass out pages 45 & 46 from the Scott Foresman Series. Have students work on this page while the teacher is working with any students who seemed to have a level of misunderstanding. Check each students work as they put it away.
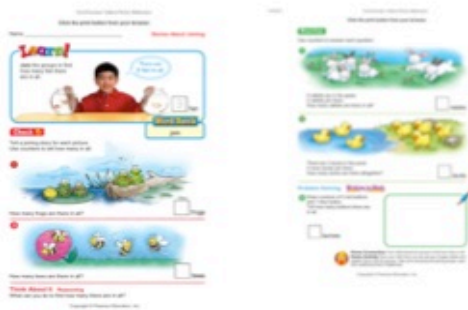
Evaluation:

Students will get their Plickers card out, and answer the question,

One part has 3 chips, and the other part has 4 chips. Using your plate and chips, how many are there altogether?

Students will have the options of:

a. 3
b. 5
c. 7
d. 9

C is the answer.

Teacher will scan the room with a mobile device to get Plickers card answer, and then evaluate the data to see who needs to be pulled for small group interventions

Closing

Close with, "Students, we just learned the first steps to understanding addition. Our goal for today was to be able to add up to 20. How would you rate yourself? Are you a 1, 2, 3, or 4 level of understanding? Remember, a 1 means you did not understand at all, a two means that you kind of get it, a three means you got it, and a four means that you could teach your friends." As the students hold up their number, make notes on roster of students who were fours, but also students who were ones and twos to pull for intervention.

Intervention:

Interventions include more practice with the plates and chips, and counting cubes and putting them together in a box
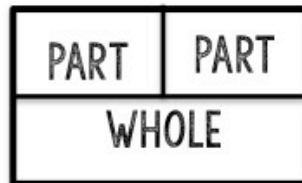
PART	PART
WHOLE	

Lesson Two
Adding with Chips and Numbers

Unit Objective: Students can add and subtract within 20 with 90% accuracy.
Lesson Objective: Students can add within 20 with 90% accuracy.

Concept: Single digit addition- understanding "part, part, whole" adding in numbers and number sentences.

Time Frame: 40 minutes

Materials:
- ✓ Three part Styrofoam plates
- ✓ Two sided color chips
- ✓ Page 47 & 48 from Scott Foresman Series

- ✓ Doc Camera
- ✓ Dry erase marker
- ✓ Dry erase board
- ✓ Index card

Vocabulary-
Part- a section of a whole
Whole- two numbers put together
Addition- when two numbers are put together to become one
Sum- What the two parts add up to

Procedures
 Introduction
Teacher will introduce the topic, "Students, today we will continue to learn about part, part, whole, and how we put numbers together. We will also be learning how to write addition sentences! We will be using these paper plates and two sided chips. Our goal is to be able to add within 20."
Teacher will need to pass out chips and plates to each student. Each student will need one plate, about 15 chips, a dry erase marker, and a dry erase board.
Teacher will need to remind students of rules while using math tools, such as: no throwing, no playing, share, not to hit others with math materials, no drawing on themselves or others with markers.
Teacher will show the class the three parts of the plate, reminding students of that the two small sections are the "parts" and the big section is the "whole".
Teacher will model how to put chips together and write a number sentence.
Teacher needs to put 5 yellow chips in one "part" and 3 red chips in the other "part". Teacher will ask student to count each part with them. After the class has counted, the teacher will model how to write the number sentence on the

Procedures continued:
white board. "I am going to use the information from our parts to write a number sentence. I am going to follow the model part+part=whole."
Write P+P=W on the board. Clarify that P is for part, and W is for whole. Also, introduce the term sum. "Class, today you're also going to learn about a new vocabulary word. The word is Sum. Sum means, the result from two parts being added together."
Next, Use your two parts to write the number sentence.
"I can see that one of my parts has 5 chips" Write 5+ on the board. "And I can see that my other part has 3 chips". Finish the equation so it reads, 5+3=.
Next, the teacher will move the parts, one at a time, to the "whole" section. Now, the teacher will show the students how all of the colored chips are in one section, and are now a whole. Now, the teacher will count out all of the chips to find the sum. After the chips have been counted, finish the number sentence so it reads, 5+3=8.
"I know that five plus three equals eight because I joined the two parts to make one whole, and counted all the chips together to find a sum of eight."

Guided Practice
Now the teacher will instruct students to put three yellow chips in one part, and six red chips in the other part on their plates. Have students give a silent thumbs up when they have their chips in place, do a quick scan of the room to ensure everyone has the correct number of chips.
Ask the students how we should write our number sentence. Have the students turn and talk to their neighbors about the number sentence. Count down from five to gain student's attention. After, ask one group to tell you the number sentence, and then write it down as a class, with each student writing it on their dry erase board.
Students should now put their chips into the "whole" section to see how many they have altogether. "Alright friends, we will now join our two parts to make one whole, or to find the sum. Join your parts together, and find the sum. Once you have counted them, finish your number sentences and give me a silent thumbs up when you're done."
As students work, rotate around the room to check for understanding.
After majority of the students have an answer, go ahead and join the two parts together and count out how many there are altogether. Ask students how many there are altogether, and how to finish the number sentence. Continue this model with three to five more examples.

Independent Practice
Students will work on pages 47 & 48 from the Scott Foresmen Series

Evaluation
Students will be instructed to fill out an exit ticket (index card)
Teacher will pose the question,
"Write an addition sentence, and find the sum of four parts and two parts. You may use your chips and plate to figure out what the number sentence is, and the sum."
Students will need to write the addition sentence, and find the sum. Teacher will collect the index cards as students finish.

Closing
Close with, "Students, we just learned the first steps to understanding addition. Our goal for today was to be able to add up to 20. How would you rate yourself? Are you a 1, 2, 3, or 4 level of understanding? Remember, a 1 means you did not understand at all, a two means that you kind of get it, a three means you got it, and a four means that you could teach your friends." As the students hold up their number, make notes on roster of students who were fours, but also students who were ones and twos to pull for intervention.

Intervention
To determine the need for intervention, use the information from the exit tickets and self evaluation. Go back to part part whole from the day before, then gradually add in the numbers and number sentences from the lesson.

Lesson Three
Adding Zero

Unit Objective: Students can add and subtract within 20 with 90% accuracy.
Lesson Objective: Students can add within 20 with 90% accuracy.

Concept: Single digit addition- understanding "part, part, whole" number sentences, and adding zero

Time Frame: 40 minutes

Materials:
- ✓ Three part Styrofoam plates
- ✓ Two sided color chips
- ✓ Dry erase markers

- ✓ Dry erase boards
- ✓ Pages 51 & 52 from Scott Foresman Series
- ✓ Doc camera
- ✓ Index cards

Vocabulary:
Part- a section of a whole
Whole- two numbers put together
Addition- when two numbers are put together to become one
Sum- What the two parts add up to

Procedures
Introduction
Teacher will review the topic, "Students, yesterday we learned about writing addition number sentences, and finding the sum. Today we will learn about addition sentences when adding zero. Our goal is to be able to add within 20."
Teacher will need to pass out chips and plates to each student. Each student will need one plate, and about 15 chips.
Teacher will need to remind students of rules while using math tools, such as: no throwing, no playing, share, and not to hit others with math materials.
Teacher will show the class the three parts of the plate, introducing the two small sections as the "parts" and the big section as the "whole".
Teacher will model first example. "I am going to put six chips in my first part, then I am going to put zero chips in my second part. Any ideas why I did that?" Students may respond with a variety of answers. "Right, I did that because I am adding zero. I have none to add. Now, let's write a number sentence. Any ideas what that might look like?" Allow students to answer, and then model writing the number sentence. "Let's write our number sentence. Six is one of the parts, and zero is the other part. So I will write 6+0=. How can I find my sum?

Procedures continued:
Students will respond with a variety of answers. "Right, I am going to join my two parts to find my sum." Join the two parts, and demonstrate that there are still six chips. "Does anyone see how when you add any number plus zero, you get the same number?" Finish the number sentence, 6+0=6. "Now we are going to practice together.

Guided Practice
Now the teacher will instruct students to put eight yellow chips in one part, and zero chips in the other part on their plates. Have students give a silent thumbs up when they have their chips in place, do a quick scan of the room to ensure everyone has the correct number of chips.
Ask the students how we should write our number sentence. Have the students turn and talk to their neighbors about the number sentence. Count down from five to gain student's attention. After, ask one group to tell you the number sentence, and then write it down as a class, with each student writing it on their dry erase board.
Students should now put their chips into the "whole" section to see how many they have altogether. "Alright friends, we will now join our two parts to make one whole, or to find the sum. Join your parts together, and find the sum. Once you have counted them, finish your number sentences and give me a silent thumbs up when you're done."
As students work, rotate around the room to check for understanding.
After majority of the students have an answer, go ahead and join the two parts together and count out how many there are altogether. Ask students how many there are altogether, and how to finish the number sentence. Continue this model with three to five more examples.

Independent Practice
Pages 51 & 52 from Scott Foresmen Series

Evaluation
Students will be instructed to fill out an exit ticket (index card)
Teacher will pose the question,
"If I have seven in one part, and zero in the other part, what will the sum be? You
may use your chips and plate to help you. Write down the number sentence on the
index card. Hold it up when you are finished."

Closing
Close with, "Students, we just learned how to add any single digit number to zero.
Our goal for today was to be able to add up to 20. How would you rate yourself?
Are you a 1, 2, 3, or 4 level of understanding? Remember, a 1 means you did not
understand at all, a two means that you kind of get it, a three means you got it, and
a four means that you could teach your friends." As the students hold up their
number, make notes on roster of students who were fours, but also students who
were ones and twos to pull for intervention.

Intervention
To determine the need for intervention, use the information from the exit tickets
and self evaluation. Go back to part part whole from the day before, then gradually
add in the numbers and number sentences, and then use the plate to show adding
zero. You can also use counting cubes if that example is more concrete for the
student. Practice writing the number sentences together.

Post Assessment

The post assessment is much like the pre-assessment. At this point, students have not learned any strategies such as counting on, using a number line, or drawing pictures. They have only learned the basics of addition. There are more adding zeros questions, as well as more questions that add up to numbers over ten.

NAME:_____

SINGLE DIGIT ADDITION POST ASSESSMENT

1. 9+5=____   8. 7+5=____

2. 4+1=____   9. 8+3=____

3. 6+7=____   10. 3+0=____

4. 5+0=____   11. 9+2=____

5. 0+3=____   12. 5+5=____

6. 6+8=____   13. 5+6=____

7. 5+0=____   14. 3+9=____

References

Howe, R. (2012, February 3). Three Pillars of First Grade Mathematics. Retrieved February 16, 2015, from http://commoncoretools.me/wp-content/uploads/2012/02/3pillars.pdf

Jordan, N. C., Glutting, J., & Ramineni, C. (2010). The importance of number sense to mathematics achievement in first and third grades. Learning & Individual Differences, 20(2), 82-88.

Nunes, T., Bryant, P., Barros, R., & Sylva, K. (2012). The relative importance of two different mathematical abilities to mathematical achievement. British Journal Of Educational Psychology, 82(1), 136-156. doi:10.1111/j.2044-8279.2011.02033.x