

ASSIGNMENT 1
PJ Mathematics Methodology, 5315A (Section 22)
Submitted to: Dr. Aamer Shujah
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Lesson plan information:

Subject/Course: Mathematics

Grade Level: Kindergarten

Date: November 23 to December 8, 2020 (Monday to Thursday)

Time: 12:30

Topic: Number Talks: Rekenrek Introductory Unit

Length of Period: 10-15 minutes per day, 10 blocks total

Expectations:**Overall expectations:****4.5 Demonstrating Literacy and Mathematics Behaviours**

15. demonstrate an understanding of numbers, using concrete materials to explore and investigate counting, quantity, and number relationships.

20. apply the mathematical processes to support the development of mathematical thinking, to demonstrate understanding, and to communicate thinking and learning in mathematics, while engaged in play-based learning and in other contexts

Specific expectations:

15.3 make use of one-to-one correspondence in counting objects and matching groups of objects

15.5 subitize quantities to 5 without having to count, using a variety of materials

15.9 compose and decompose quantities to 10

20.1 demonstrate an understanding of number relationships for numbers from 0 to 10, through investigation (e.g., show small quantities using fingers or manipulatives)

Content

Students will learn about how to display numbers using a Rekenrek. They will be able to compose and decompose numbers into various parts, subitize the coloured beads in groups of 5 and 10, and begin to explore counting on. The relationship between the ten frames and Rekenrek will be explored.

Assessment/Evaluation:

Observational assessment will be conducted during the number talks as the students will be asked to demonstrate their numbers with their own personal Rekenrek. A formative individual interview assessment

will be done during learning centers to check for student understanding and evaluate what learning gaps are from the desired expectations.

Learning Context:

A. The Learners

- (i) What prior experiences, knowledge and skills do the learners bring with them to this learning experience?
- (ii) How will I differentiate the instruction

The majority of the students have had no prior experience in using a Rekenrek. So far, their number talks have been conducted using dot pictures as well as 10 frames. Some students are at a junior kindergarten level while others are at a senior kindergarten level.

The instruction will be differentiated in a way that any solutions with the Rekenrek will be explored by counting the beads. Counting on and decomposing numbers using two rows will be more directed at the senior kindergarten students, however junior kindergarten students will be asked to count the beads in play.

B. Learning Environment

All students will be at the puppy pad, (formally called the calming carpet, pre COVID-19) sitting down and facing the instructor.

C. Resources/Materials

- Number Talks Book
- 19 Rekenreks for students
- 19 Individualized pouches for Rekenreks (COVID-19 precaution)
- Giant teacher Rekenreks
- Bear Stickers on Rekenreks
- Starting position poster above Smartboard
- Smartboard
- PowerPoint Slide Deck (TPT see References)
- Online Rekenrek App
- Interview prompts
- Sticker for student completion

Teaching/Learning Strategies:

INTRODUCTION (hook): “Today we will use a new math tool that is called a Rekenrek. Let’s say that out loud and count the claps. We will feed a bear with different numbers.”

MIDDLE:

Note:

- After each number has been shown, the students are instructed to go back to the starting position.
- Shorthand used (for instructor only) for Rekenreks is top row first and bottom row second. Therefore $4 + 1 = 5$ beads are on the top row and 1 bead is on the bottom row. To the students, it’s “4 and 1 make 5” (with clapping and fingers).
- Counting as a class the answers will help build skills for students in the “reciter” stage (Van de Walle, Karp, & Bay-Williams, 2019).

Lesson Progression

- Day 1: exploring the Rekenreks learning start position
- Day 2: use top row to demonstrate numbers and counting (Junior Kindergarten). Establish the subitize 5 red beads
- Day 3: exploring the bottom row and showing it can be in play (decomposition of numbers Senior Kindergarten)
- Day 4: reinforcing the bottom row for decomposition
- Day 5: reinforce the group of five red beads
- Day 6: use both rows and explore decomposition
- Day 7: use top row only and explore counting on from 5
- Day 8: have students draw on Smartboard various combinations
- Day 9: explore how many more to make 10 on Rekenrek top row and ten frame simultaneously
- Day 10: review

Day 1

- Physical Rekenreks
- Shake the Rekenrek
- Learn starting position by having the students align the beads to the right-hand side. Students should use the bear stick to know how to hold/view Rekenrek.
- Have students count the top rows of beads together moving one at a time. Stop at 5 to show that there are 5 red beads and 5 white beads.
- Explain when beads are to the left, they are “in play” showing a number.
- Have the students count out 3, 7.

Day 2

- Physical Rekenreks
- Have students show starting position.
- Ask students how many beads are on the top row.

- Have students show the number 4 on top row.
- Have students show a variety of numbers on top row and discuss.
- Have students count and re-establish the number of red beads on top row, 5.
- Ask students who can move 5 beads in play the fastest. Follow up with the fastest student to establish that there will always be 5 red beads and they were moved at once.

Day 3

- Use online Rekenrek with Smartboard.
- Ask how many beads are on the top row. Ask how many are red and how many are white.
- Ask students how many beads are on the bottom row.
- Explain that the bottom row can be “in play” and combined.
- Show 3 with online Rekenrek as $2 + 1$.
- Count the 3 for JK students.
- Ask if there is another way I can show 3 ($3+0$, $2+1$, $1+2$, $0+3$), illicit student response/participation.

Day 4

- Physical Rekenreks
- Ask how many beads are on the top row. Ask how many are red and how many are white.
- Ask students how many beads are on the bottom row.
- Remind them that the bottom row can be “in play” and combined.
- Ask the students to show 4.
- Go through every version of 4 ($4+0$, $3+1$, $2+2$, $1+3$, $0+4$) to show multiple ways of making 4.
- Repeat process with number 3, 2.

Day 5

- Physical Rekenreks
- Ask how many beads are on the top row. Ask how many are red and how many are white.
- Ask students how many beads are on the bottom row.
- Remind the students that the bottom row can be “in play” and combined.
- Ask the students who can show 5 the quickest.
- Pick the student that showed either $5 + 0$ or $0 + 5$, ask them if they had to count or not? Why? (student should remember 5 red).
- Go through other examples of 5 combinations ($4+1$, $3+2$, etc.).
- Time allowing, have students show 8 in various decomposed forms.

Day 6

- Use online Rekenrek with Smartboard.
- Ask how many beads are on the top row. Ask how many are red and how many are white.
- Ask students how many beads are on the bottom row.
- Remind them that the bottom row can be “in play” and combined.
- Ask a volunteer student to show 8, 9, 4, 5.
- After every example, ask if there is another way to show it or another way to see it.

- Continue until time has expired.

Day 7

- Physical Rekenreks
- Ask how many beads are on the top row. Ask how many are red and how many are white.
- Ask students how many beads are on the bottom row.
- Remind the students that the bottom row can be “in play” and combined.
- Have the students show 8 on the top row only (view for students that count on from 5 red beads).
- Model counting on from 5. Slide all 5 red beads then count the remaining three out loud “I keep 5 in my brain, what comes after 5? 6, 7, 8.”
- Repeat with 6 on top row only.
- Repeat 8 and 7 putting 5 on the top row and remainder on bottom row.

Day 8

- Smartboard using slide deck
- Show me your 8, have students draw beads on the “in play session.”
- Repeat with other numbers.

Day 9

- Physical Rekenreks
- Ask how many beads are on the top row. Ask how many are red and how many are white.
- Draw 10 frame of the number 7 with the first row of 5 full.
- Ask students to make the number 7 on top row of their Rekenreks.
- Ask students: “Without moving beads on the top row, how many beads would they need in play to make 10 (3 remaining white beads)?”
- Draw similarity to the ten frame.
- Count for junior kindergarten the white beads or empty spaces on 10 frame.

Day 10

- Review concepts

Consolidation and/or Review Process:

Kindergarten is constantly in a stage of repetition. Day 10 is a review phase but the consolidation happened at the beginning of each lesson reminding the students about the number of beads, grouping of fives and tens, and how to implement the starting position.

Reflection:

I was given flexibility on how to incorporate an introductory unit in Renkenreks. It was recommended that I do it in number talks over a period of many days. From my formative assessment, I can see that most of the students are able to use the Rekenrek and therefore in that regard I was successful. However, if I were to do this again, in hindsight I would have done more blocks with a variety of ten frames, Rekenreks, and dot pictures. I believe near the end of the unit some of the students were not as engaged or excited to use the Rekenreks. This is partly why I incorporated some Smartboard elements to vary up what we were doing. I will say that while I have never used a Rekenrek prior to teaching this lesson, I am now a convert on using this in the primary grades. How it groups twenty beads into rows of ten with groups of five red beads and five white beads is excellent. The Rekenrek is an excellent math manipulative that leads to cardinality, subitizing, decomposition, and groupings of five and ten. (Jeffrey Frykholm)

Assessment

Throughout the unit there was formative assessment “as” learning through observation and dialogue during the lesson. If I noticed that a student was not understanding the starting position or miscounted based on visual observation of their Rekenrek, I would correct them during the lesson. Kindergarten does not have grades but rather anecdotal observations on what the students know or are having difficulty with. Therefore, there is a lot of observation done throughout the day. I was able to observe my associate teacher divide the class for math games based on ability by doing a simple interview process on how the student can count and if they can recognize the symbols for the numbers. I decided to implement the same approach to see where the students were at their understanding of the Rekenrek. Therefore, this interview could be seen as an assessment “of”, do the students understand the various numeracy skills. It could theoretically be graded; however, the main purpose is to have an assessment “for” learning. The results inform which students may require additional supports such as smaller groups or individualized instruction.

<p>Name:</p> <p>Show 3 [], Show 5 [], Show 10 []</p> <p>Show 7 7+0 [], 6+1 [], 5+2 [], 4+3 [], 3+4 [], 2+5 [], 1+6 [], 0+7 []</p> <p>Show 6</p> <p>How many to make 10? []</p> <p>How many beads on the Rekenrek?</p> <p>Show 8 [], add 5 [], How many to make 20? []</p>

The check list above works as a guide to confirm if a student has appropriate understanding of the Rekenrek concepts. It is scaffolded much like the lesson plan. It begins with asking the child to show a number, then show a group of five, and finally a group of 10. Ultimately the goal for the 5 and 10 was to see if the student could subitize the amounts and use one pull without counting the beads individually. The next concept is seeing how many different ways the student can represent seven through decomposition. This is important to see their mental flexibility on their representations of 7. Their showing of six beads (during interview it was mentioned top row only) primes the student for the next question on how many beads to make 10. The student should see that there are 4 beads on the right-hand side not in play. This is a key concept to see if students can visualize this prior to teaching them subtraction at the end of the year. The final questions about 20 beads are outside of the scope of kindergarten. The requirements for kindergarten are numbers from 1 to 10, however the final 4 questions were to see how advanced some of the students were. As you will see with the samples, this is not merely a check list but also a written record of observations.

Student 1	Name Student 2
Show 3 <input checked="" type="checkbox"/> , Show 5 <input checked="" type="checkbox"/> , Show 10 <input checked="" type="checkbox"/> <i>counts every one</i>	Show 3 <input checked="" type="checkbox"/> , Show 5 <input checked="" type="checkbox"/> , Show 10 <input checked="" type="checkbox"/> <i>counts one at a time (needed) help?</i>
Show 7 7+0 <input checked="" type="checkbox"/> , 6+1 <input type="checkbox"/> , 5+2 <input type="checkbox"/> , 4+3 <input type="checkbox"/> , 3+4 <input type="checkbox"/> , 2+5 <input type="checkbox"/> , 1+6 <input type="checkbox"/> , 0+7 <input type="checkbox"/>	Show 7 7+0 <input checked="" type="checkbox"/> , 6+1 <input type="checkbox"/> , 5+2 <input type="checkbox"/> , 4+3 <input type="checkbox"/> , 3+4 <input type="checkbox"/> , 2+5 <input type="checkbox"/> , 1+6 <input type="checkbox"/> , 0+7 <input checked="" type="checkbox"/>
Show 6	Show 6 <input checked="" type="checkbox"/>
How many to make 10? <input checked="" type="checkbox"/> <i>14 makes 11</i>	How many to make 10? <input checked="" type="checkbox"/>
How many beads on the Rekenrek? 20	How many beads on the Rekenrek? <input checked="" type="checkbox"/>
Show 8 <input checked="" type="checkbox"/> , add 5 <input checked="" type="checkbox"/> , How many to make 20? <input checked="" type="checkbox"/> <i>counts one by one</i>	Show 8 <input type="checkbox"/> , add 5 <input type="checkbox"/> , How many to make 20? <input type="checkbox"/>

Student 1 is a senior kindergarten student. He did not have junior kindergarten experience and was only enrolled in full day in the 2020 year. For the first part he was able to correctly count but he was not able to subitize the 5 or the 10. He could only show 7 as the top row even after prompts and therefore he will need help with number decomposition. Finally, it was recorded that he said “14 makes 11”. When given a task to count one by one he accomplished it. Similarly, Student 2 a junior kindergarten student, could only count one by one but had issues even making 10, needing prompting. Anything past 10, he was unable to accomplish. This informs an educator that even though there is a student that, based on age, is a senior kindergarten stream they should be group on ability with the junior kindergarten group.

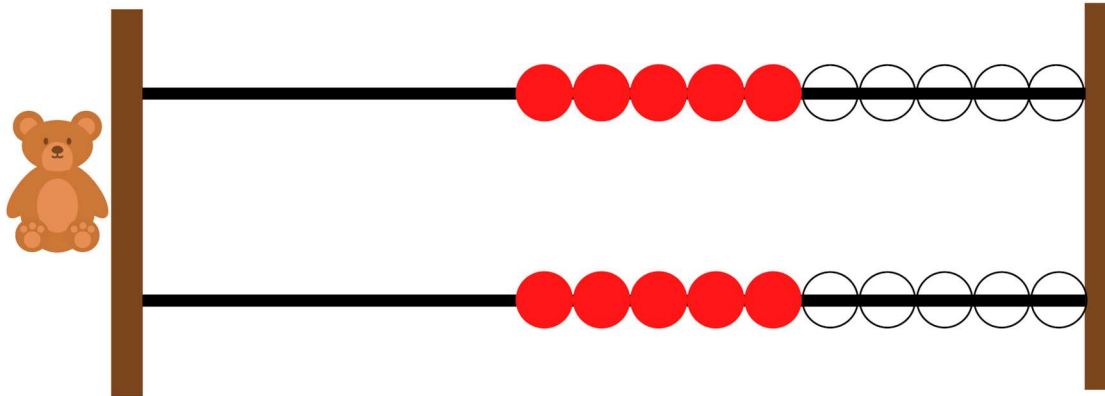
Student 3	Student 4
<p>Show 3 [✓], Show 5 [✓], Show 10 [✓] ↳ perfect one pull</p> <p>Show 7 7+0 [✓], 6+1 [✓], 5+2 [✓], 4+3 [], 3+4 [], 2+5 [✓], 1+6 [], 0+7 [✓]</p> <p>Show 6 ✓</p> <p>How many to make 10? [✓] 4</p> <p>How many beads on the Rekenrek? ✓ 20</p> <p>Show 8 [✓], add 5 [✓], How many to make 20? [✓] ↳ sort of 10s</p>	<p>Show 3 [✓], Show 5 [✓], Show 10 [✓] one pull all ten</p> <p>Show 7 ✓ 7+0 [✓], 6+1 [✓], 5+2 [✓], 4+3 [], 3+4 [✓], 2+5 [], 1+6 [], 0+7 [✓]</p> <p>Show 6 ✓</p> <p>How many to make 10? [✓] four white ones moved red bottom</p> <p>How many beads on the Rekenrek? ✓ 20</p> <p>Show 8 [✓], add 5 [✓], How many to make 20? [✓]</p>

Student 3 is a senior kindergarten student with junior kindergarten experience. He was able to make all the numbers with one pull. He was also able to decompose 7 in numerous ways but needed a prompt for the 3 + 4 and 4+3. On prompting he was able to reverse these two numbers which means he is starting to grasp the commutative property. Student 4 answered most of the questions correctly and instead of just calling out the 4 white beads that were left, moved 4 red beads from the bottom row to make 10 in play. Student 3 and 4 should be group in a

higher math ability group. They are also able to begin exploring subtraction, addition, and may use numbers up to 20. This will better prepare them for the first grade.

Appendix

Start Position



WE FEED THE BEAR

Poster created by Markus Richter. Each student has a bear sticker on the left side of the Rekenrek to ensure they are lining up the beads correctly. In years past the rhyme “white is right” was used. I deem the terminology inappropriate and some junior kindergarten students could not differentiate between their right side and left side.

GUESS MY WAY

5

Build five on your rekenrek. Let's see if you can guess MY way. (Draw students' ideas, then advance to next slide.)

Unit 4 © Primary Bliss Teaching Lesson 18

Sample slide from Primary Bliss Teaching (Teaching, 2020)

References

- Jeffrey Frykholm, P. (n.d.). Learning to Think Mathematically with the Rekenrek: A Resource for Teachers, A Tool for Young Children. Boulder, Colorado, USA. Retrieved November 19, 2020, from <https://www.mathlearningcenter.org/resources/lessons/learning-to-think-mathematically>
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