Planning Instruction around the Rekenrek without having a *Wreck N Wreck*

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Empowering educators to advance student mathematical thinking and success … through Math Recovery® Principles

WELCOME

The bead rack can be a means of *scaffolding* and *communicating*.

In this role, the bead rack can serve as a means of support in a process that aims at helping students to build on their own thinking while constructing more sophisticated mathematics.

— *How Concrete is Concrete?* Koeno Gramemeijer, 2011

Arithmetic Rack as a Tool

To aid children in developing a network of relations through Number Talks in the Classroom.

In the Classroom
Second Grade

Developing 5	Knows 5	Developing 10	Knows 10	Developing 20	Knows 20
Eli (Amost 1)	Caleb	Nick (knows 10/ not all - 9)		Anna	Max
David	Brianna	Gabriel (knows 10/ not all)			Shane
Caitlyn	Manu				Hali
Avasa	Jasmine				
O-Dan	Gwyn				
	Mikayla				
	Andrew				
	Gabby				
	Ethan				

Example Math Time

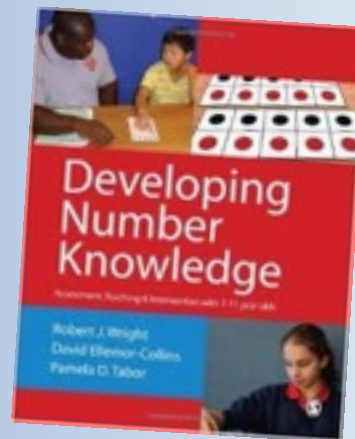*60-70 minute Math time*

- *10 min: Math Talk*

- *20-30 min: Whole class lesson*

- *20 min: Small Group/ Independent practice*

- *10 min: Wrap-up*
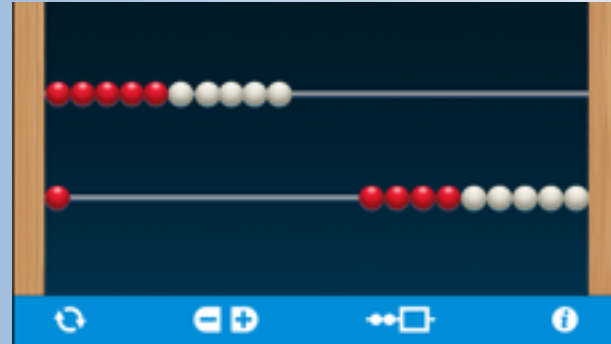
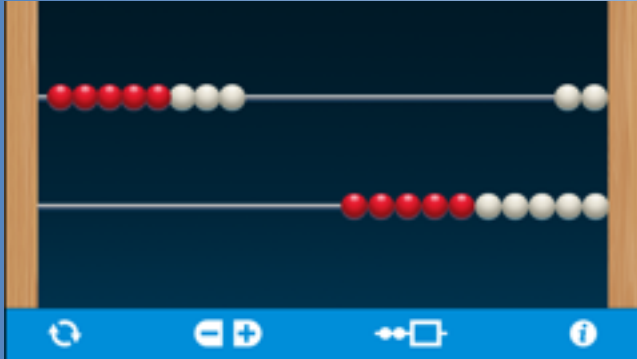# Let's Practice!

Number Talk

Developing Number Knowledge: Assessment, Teaching & Intervention with 7-11 Year-Olds

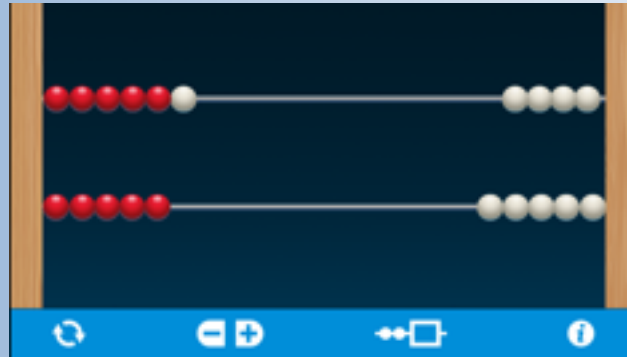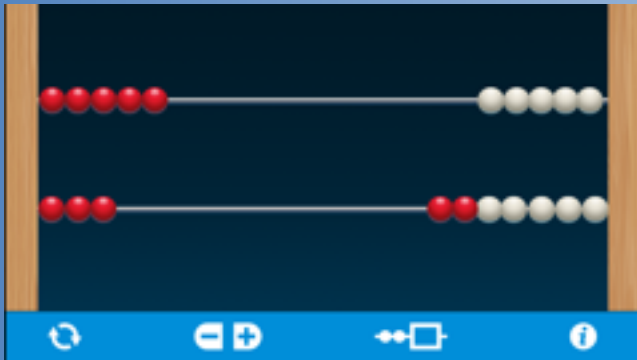By Robert Wright, David Ellemor-Collins & Pam Tabor

Pattern Types

Ten-wise

Five-wise

Pattern Types

Pair-wise

Make Five-wise 14

Make Ten-wise 14

Make Five-wise 14

NUMBER TALK 3

Independent/Partner Practice: *Racing Sums*

Number Talk 3

Addition with Both Addends in the Range 1-10

Teacher shows 4 beads on the top row and 3 beads on the bottom row. Ask, "How many altogether?" Allow for students to share a variety of responses and strategies.

Continue with addition situations involving a number up to 10 on the top row and a number up to 10 on the bottom row. Teacher cards are included to aid in number selection.

NUMBER TALK 4
Independent/Partner Practice: *Racing Sums*

Number Talk 4

Teacher shows 4 on the top row of the bead rack. Say, "What is 4 and 3 more?"
Allow for students to share a variety of responses and strategies. As students share strategies, the student or teacher can model the thinking on the bead rack.

Continue with addition situations involving a number up to 10 on the top row and a number up to 10 on the bottom row. Teacher cards are included to aid in number selection.

NUMBER TALK 5

Take away

Number Talk 5

Say, "Make 8 on the bead rack." Allow for a variety of ways students make eight. Say, "Take 5 away. Students may find a solution by mentally or physically moving beads from either row. As students share their strategies, the student or teacher can model thinking on the bead rack.

Teacher cards are included to aid in number selection. Use teacher cards as follows, "Say the total for the provided partition. Tell students to take away one of the parts indicated on the card. For example, the card 8 and 3 would be read: "Make 11 on the bead rack." Follow by saying, "Take 8 away." **OR** "Take 3 away".

NUMBER TALK 5

Take away

Independent/Partner Practice: *Cube it up - Pick it up!*

NUMBER TALK 6

6 + 2

8 + 6

Number Talk 6

Teacher flashes a 6 on the top row of the bead rack. Show "6 + 2" expression card. After a student shares an answer, uncover the 6. Use the bead rack to support students explanation or as a check for the correct response.

NUMBER TALK 7

Number Talk 7

Say, "Show 14 on the bead rack. Say, "How many less to make 12?"*
Allow students flexibility in how they show 14 on the bead rack.
Students may find a solution by mentally or physically moving beads. As
students share strategies, the student or teacher can model thinking on
the bead rack.

* Can also say, "14 take away what is 12?"

NUMBER TALK 9

Number Talk 9

Show 13 on the bead rack. Say, "What is the difference between 13 and 17?" As students share strategies, the student or teacher can model thinking on the bead rack.

Initially students may have their own bead racks during the number talk. This moves to students not having their own bead rack and only imagining the movement of beads by viewing the teacher bead rack.

Questions

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The number talk instructional sequence described in this handout is based on *Developing Number Knowledge* by Robert Wright, David Ellemor-Collins, and Pamela Tabor.

*The **power within the number talks** is not only in the strategies that children share, but the way in which the bead rack supports strategy development as a **tool for conversation**. The **way a teacher makes explicit** a child's strategy by manipulating the bead rack according to a child's verbal explanation supports all students development of number relationships and mental computation.*

For questions or to share about your experience using the bead rack for number talks, please feel free to contact Christina Miller at christina@mathrecovery.org.

Number Talk A

Ten Frames - all visible

Go through 5 plus patterns only. Show dots. Ask students, "How many dots?"
Go through pairs patterns 6-10. Show dots. Ask students, "How many dots?"

Mix 5 plus patterns and pairs pattern cards. Show dots. Ask students, "How many dots?"

Go through mixed 5plus and pairs pattern cards. Flash dots. Ask students, "How many dots?"

Independent/Partner Activity:
SNAP using 5plus and pairwise ten frames and number cards 6-10

Number Talk B

Ten Frames - Student Fill in Partitions of 10

Each child has a blank ten frame. This can be paper or electronic. Show a partition of 10 card - 5wise. Have students create the partition on their own card. Ask, "How many are red? How many are blue?"

Show a partition of 10 card - pairwise. Have students create the partition on their own card.

Show a partition of 10 cards - Mixed. Have students create the partition on their own card.

Flash a partition of 10 cards - Mixed. Students say the partition.

Independent/Partner Activity:
Ten Frame memory: Each card set has 0-10 frames. Students find two frames that go together to make 10.

Number Talk C

Ten Frames - Partitions of numbers up to 10

Teacher shows partition cards of small combinations. 0-5 light dots combined with 0-5 dark dots. Ask, "How many light dots?" "How many dark dots?" "How many altogether?"

Have students record the number of light and number of dark on a white board or electronic device.

Teacher flashes partition cards of small combinations. 0-5 light dots combined with 0-5 dark dots. Ask, "How many light dots?" "How many dark dots?" "How many altogether?"

Bead Rack: Making and Reading Numbers 1 to 20

Number Talk 1

Making Number Patterns

The purpose of this set of number talks is for students to learn the standard patterns for numbers on the bead rack.
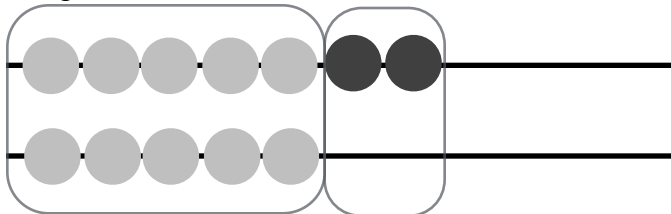
1A Ten-wise Patterns: Each student has a bead rack.

Say, "With one push, show 8 on the top." Once students have made 8 on their own bead racks, the teacher displays 8 on the top row as a way for students to check and modify their own bead rack if needed. Similarly, Say, "Show 10 on the top and 1 on the bottom for numbers 11-20.

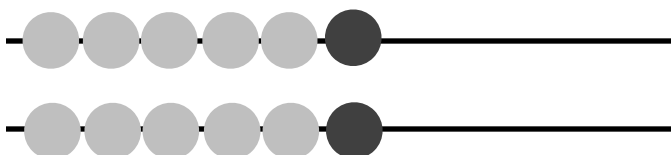Say, "Show _____ on the top and _____ on the bottom.

1B Five-Wise Patterns: Each student has a bead rack.

Say, "Show 5 on the top and 3 on the bottom." Once students have made 8 on their own bead racks, the teacher displays 8 with 5 on the top row and 3 on the bottom row as a way for students to check and modify their own bead rack if needed. Ask, "How many altogether?" Similarly, Say, "Show 6 on the top and 5 on the bottom. How many altogether"

1C Pair-wise Patterns: Each student has a bead rack.

Say, "Show 4 on the top and 4 on the bottom." Once students have made 8 on their own bead racks, the teacher displays 8 with 4 on the top row and 4 on the bottom row as a way for students to check and modify their own bead rack if needed. Ask, "How many altogether?" Similarly, Say, "Show 7 on the top and 7 on the bottom. How many altogether"

Number Talk 2

Reading the Number of a Flashed Pattern

Flash a number pattern on the bead rack. Students identify the number and write that number. Vary the patterns flashed between ten-wise, five-wise and pairwise. Collect student responses and strategies. As students share their strategies, model student thinking on the bead rack as appropriate.

To vary recording: Students can draw a 3 x 3 grid and write in their own numbers from 8-20. Once a number is flashed that matches one of the numbers on their grid, that number is crossed out. Students are trying to get 3 in a row.

Number Talk 3

Addition with Both Addends in the Range 1-10

Teacher shows 4 beads on the top row and 3 beads on the bottom row. Ask, "How many altogether?" Allow for students to share a variety of responses and strategies.

Continue with addition situations involving a number up to 10 on the top row and a number up to 10 on the bottom row. Teacher cards are included to aid in number selection.

Independent/Partner Activity: Racing Sums

Materials:
Bead Rack for each player
Two 1-9 Spinners
Game Marker per player

Directions:

Play begins with the Game Marker on Start.
Player 1 spins both spinners and builds the number as indicated by the spinners. If the sum is equal to the next space on the game board, the player moves forward 1 space. If the sum is not equal to the next space, the player stays on the current space.

Player 2 continues as above. The first player to reach STOP wins.

Number Talk 4

Teacher shows 4 on the top row of the bead rack. Say, "What is 4 and 3 more?"
Allow for students to share a variety of responses and strategies. As students share strategies, the student or teacher can model the thinking on the bead rack.

Continue with addition situations involving a number up to 10 on the top row and a number up to 10 on the bottom row. Teacher cards are included to aid in number selection.

Independent/Partner Activity: Racing Sums

Materials:
1 Bead Rack
Two 1-9 Spinners
Game Marker per player

Directions:

Play begins with the Game Marker on Start.
Player 1 spins both spinners. If needed, players build the top row number. If the sum is equal to the next space on the game board, the player moves forward 1 space. If the sum is not equal to the next space, the player stays on the current space.

Player 2 continues as above. The first player to reach STOP wins.

Number Talk 5

Say, "Make 8 on the bead rack." Allow for a variety of ways students make eight. Say, "Take 5 away. Students may find a solution by mentally or physically moving beads from either row. As students share their strategies, the student or teacher can model thinking on the bead rack.

Teacher cards are included to aid in number selection. Use teacher cards as follows, "Say the total for the provided partition. Tell students to take away one of the parts indicated on the card. For example, the card 8 and 3 would be read: "Make 11 on the bead rack." Follow by saying, "Take 8 away." **OR** "Take 3 away".

Independent/Partner Activity: Cube it up - Pick it up!

Materials:
8 unifix cubes per player (Teacher can vary the number of cubes depending on time for play)
1 Bead rack for each player
1 game board for each player
1 Set of Spinners (Starting Number and Part)

Directions:

Each player records a number between 1 and 18 in each box at the bottom of the board. Each player then puts a cube in the boxes above each number for the number of times they predict they will get that number. For example, one player may record 7, 8, 9, 10, 11, 12 across the bottom of the board. Then the player decides to put 3 cubes in the 10 column and one cube above each of the other numbers.

Player 1 spins to determine the "Starting Number". Both players build the number on their bead rack. Player 1 then spins the second spinner to determine the amount to take away from the starting number. If the student has the solution on his or her game board, that player removes a cube from that column.

Play continues with each player taking turns using the spinner. The first player to remove all of his or her cubes from the game board is the winner.

Number Talk 6

Teacher flashes a 6 on the top row of the bead rack. Show "6 + 2" expression card. After a student shares an answer, uncover the 6. Use the bead rack to support students explanation or as a check for the correct response.

Number Talk 7

Say, "Show 14 on the bead rack. Say, "How many less to make 12?"* Allow students flexibility in how they show 14 on the bead rack. Students may find a solution by mentally or physically moving beads. As students share strategies, the student or teacher can model thinking on the bead rack.

* Can also say, "14 take away what is 12?"

Number Talk 8

Show the number card, "6+5" Ask, "What is the sum?" Students share answers. Have a small number of students share a strategy for solving 6+5. Show the bead rack as needed to support student explanations.

Number Talk 9

Show 13 on the bead rack. Say, "What is the difference between 13 and 17?" As students share strategies, the student or teacher can model thinking on the bead rack.

Initially students may have their own bead racks during the number talk. This moves to students not having their own bead rack and only imagining the movement of beads by viewing the teacher bead rack.

Number Talk 10

Say, "What are two numbers that add to make 15?" As students share strategies, the student or teacher can model thinking on the bead rack.

Number Talk 11

Show the number card, "11-4" Tell students to solve. Have students share their answers and the strategy used to solve the problem. As student share strategies notice how they are interpreting the subtraction sentence (take away/difference/partition)   Show student strategies on the bead rack as needed to support student led explanations.

Racing Sums

Start

10

Less than 10

12

11

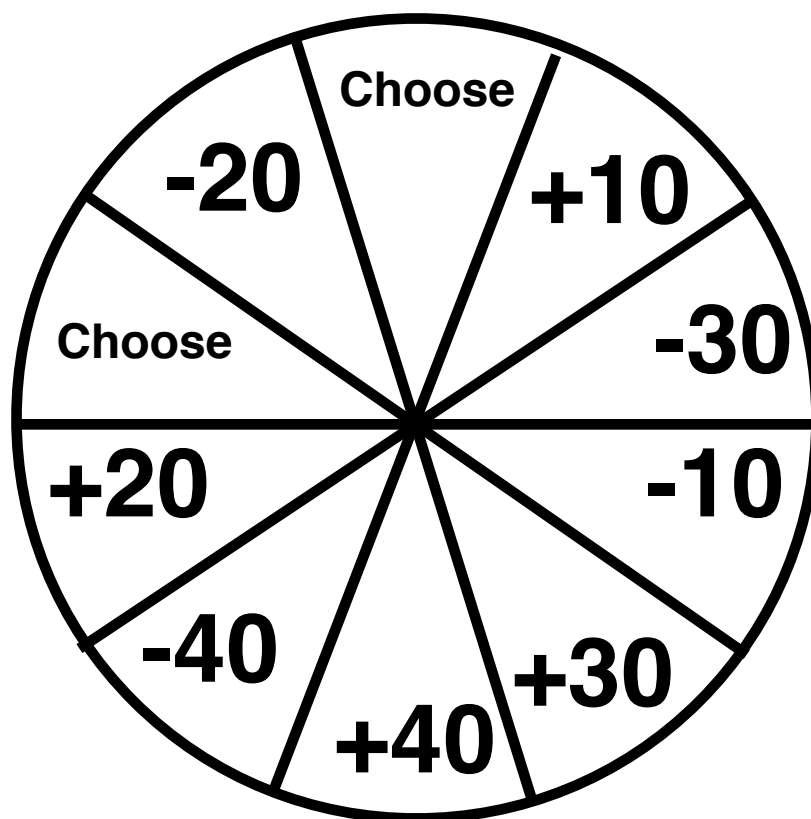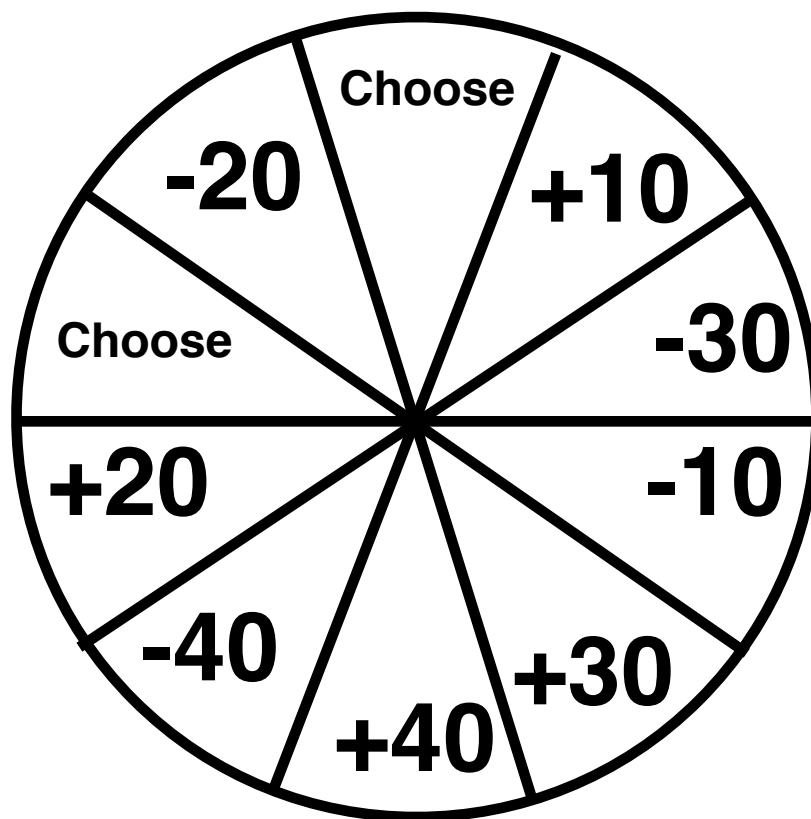13 | 12 | 11

10 | More than 10 | 14

10

Less than 10

15

STOP

10 | 9 | More than 10

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Cube it up - Pick it up!

1 and 1	2 and 2	3 and 3	4 and 4
5 and 5	5 and 1	5 and 2	5 and 3
5 and 4	5 and 5	1 and 2	1 and 3
1 and 4	1 and 5	2 and 1	2 and 3
2 and 4	2 and 5	3 and 1	3 and 2
3 and 4	3 and 5	4 and 1	4 and 2

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4 and 3	4 and 5	5 and 1	5 and 2
5 and 3	5 and 4	6 and 6	7 and 7
8 and 8	9 and 9	10 and 1	10 and 2
10 and 3	10 and 4	10 and 5	10 and 6
10 and 7	10 and 8	10 and 9	10 and 10
5 and 6	5 and 7	5 and 8	5 and 9

5 and 10	9 and 1	8 and 2	7 and 3
6 and 4	6 and 1	6 and 2	6 and 3
7 and 1	7 and 2	7 and 4	8 and 1
8 and 3	8 and 4	9 and 2	9 and 3
9 and 4	6 and 7	6 and 8	6 and 9
7 and 8	7 and 9	8 and 9	

12 and 1	12 and 2	12 and 3	12 and 4
12 and 5	12 and 6	12 and 7	12 and 8
13 and 1	13 and 2	13 and 3	13 and 4
13 and 5	13 and 6	13 and 7	14 and 1
14 and 2	14 and 3	14 and 4	14 and 5
14 and 6	15 and 1	15 and 2	15 and 3

15 and 4	15 and 5	16 and 1	16 and 2
16 and 3	16 and 4	17 and 1	17 and 2
17 and 3	18 and 1	18 and 2	19 and 1