100 Bead String Activities

Purpose: The purpose of the 100 bead string is to provide children with a visual quantity of number and be able to relate that visual to numerical representations. While doing these activities, it helps if you can model in writing how to record the child's thinking when using the bead string. This will help them to bridge from the visual to the numerical representation.

The 100 bead string can be screened by using a paper towel or wrapping paper tube. Cut a slit in the tube that runs the length of the tube and then wrap it around the bead string. Children will be able to move from using the bead string physically towards picturing the bead string in their mind while understanding quantity and math operations.

The colour of the beads is chosen purposefully in order to facilitate children in "pushing" quantities over in one push or identifying quantities without counting by ones. Throughout the activities listed below, the child may need to be reminded to use chunks, typically 5 or 10 beads, rather than counting by ones.

Part/whole number work to 100
Develop part/part/whole relationships that can be used in mental computation as well as understanding of written process/rules.

Using the 100 bead string have the child push over a number that is between 20 and 100. The child uses their finger to separate that number into two parts. For example, a child pushes over 37. The beads can be parted at 30 and 7, 20 and 17, 25 and 12 and so on….Child can record combinations that make that number. You might note which numbers they find easier to work with.

Skip Counting
Child should say the numbers and push over the quantity as each number is said. This will build quantity and verbal sequence together. Adding in a written component would then bring in the third aspect of number: symbolic.

Activity 1   Counting by 10s on the decade forward and backward
                Examples: 10, 20, 30, 40, 50 to 100
                            100, 90, 80, 70, 60 to 0

Activity 2   Begin in different places along the bead string.
                Examples: 50, 60, 70, 80, 90, 100
                            60, 50, 40, 30, 20 10

Knowing sequences by 10 off the decade is a necessary skill to mental addition and subtraction strategies.

Activity 3   Counting by 10s off the decade forward and backward
                Examples: 4, 14, 24, 34, to 94
                Extension: What would come after 98? How can we show that number
                when our bead string only goes to 100?
                            96, 86, 76, 66, 56, to 6

Activity 4   Begin at different places along the bead string.
                Examples: 36, 46, 56, 66
                            48, 38, 28, 18, 8

Building confidence with multiples forward and backward.

Activity 5   Counting forward and backward by a number in the range of 2-9
                Example   4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48
                            6, 12, 18, 24 to 72

Bring child's attention to the colour in the beads. The colour can be used for child to immediately recognize what the next multiple is as well as determine the next set of beads to push over without counting by ones.

In order for a child to use multiplication and division strategies that build off familiar facts, they need to be able to recall multiples from various starting points.

Activity 6   Counting forward and backward by a number in the range of 2-9 from various locations within the range of multiples.
Example   (4s) 20, 24, 28, 32, 36, 40, 44, 48
(6s) 54, 48, 42, 36, 30, 24

Two Digit Addition: Place Value
Children can readily know that 40 + 4 is 44 without needing to count **40**, 41, 42, 43, 44.

Activity 1   Beginning with a decade number and adding a single digit
Examples: 40 + 3   60+7

Children can use what they know about 10 and combinations that make 10 in order to do these calculations without counting by ones (**36**, 37, 38, 39, 40).

Activity 2   Beginning with a two-digit number and naming the amount to the next decade.
Examples: 36 – How many to 40?   41 – How many to 50?

Do this calculation without counting by ones. Childs may separate the tens and ones to solve these.

Activity 3   Beginning with a two-digit number and adding an amount that is within the decade of the two digit number.
Examples: 42 + 6   56 + 3   7 + 31

Concentrate on the colours pushed over to get to the next decade and the combination of the one digit number that the children need to know in order to solve the problem without counting by ones.

Activity 4   Beginning with a two-digit number and adding through the decade.
Example: 37 + 6   45 + 8

In the first example (37+6), concentrate on the colours pushed over to get 40 and the combination of 6 that the child needs to know in order to solve this problem.
Note: No matter the age, the child will not be able to successfully move forward with this activity unless they are able to structure ten and the numbers up to 10.

Activity 5   Pose 2 digit and 2 digit addition problems. This activity is designed to use and discuss "jump strategies". Jump strategies are strategies that are linear; moving up the number line.
Example: **46 + 64**   46 + 4 $\rightarrow$ 50 + 60 $\rightarrow$ 110
38 + 17   38 + 10 $\rightarrow$ 48 + 2 $\rightarrow$ 50 + 5 $\rightarrow$ 55
Children can record their strategies by using an empty number line.

Activity 6 "Tens and Ones Strategies" can be developed by using two 100 beads and placing the strings one on top of the other.
Example   46 + 57

46 beads are pushed over on the top string and then 57 beads pushed over on the bottom set of beads. Childs can nudge over the ones and join those quantities as well as join the tens.

Note: This is a good time to bridge to mini ten frames for two-digit addition and subtraction.

Activity 7 Using 2 bead strings is a good tool to demonstrate a Change to Equality Strategy.
<u>Example:</u> The solution for 48 + 36 can be found by solving 50 + 34.
By placing two bead strings one above the other, the child can add 2 beads to the top string while taking 2 beads off of the bottom string and thus showing that the beads present are the same – they are just redistributed to another string.

Two Digit Subtraction: Place Value
So that children can readily know that 36 -6 is 30 without needing to count by ones.

Activity 1 Beginning with a two-digit number and naming the amount to the previous decade.
Examples: 36 – How many to 30?   43 – How many to 40?

Children can readily know that 40 - 4 is 36 without needing to count **40**, 39, 38, 37, 36.

Activity 2 Beginning with a decade number and subtracting a single digit
Examples: 40 - 4   60 – 7

Discuss with the child how knowing the combination that makes 10 can help us to do these calculations without counting by ones. Childs may separate the tens and ones to solve these.
Be aware of discrete counters during this activity. They will arrive at the same answer, but their sequence would sound like 40, 39, 38, 37 so the answer is 36.

Activity 3 Beginning with a two-digit number and subtracting an amount that is within the decade of that number.
 Examples: 46 - 4   58 - 3

Activity 4 Beginning with a two-digit number and subtracting through the decade.
Examples: 34 - 6   45 - 8

Concentrate on the colours pushed over to get to the previous decade and the combination of the one digit number that the children need to know in order to solve the

problem without counting by ones.
So in the first example, (34 - 6) concentrate on the colours pushed over to get 30 and the combination of 6 that the child needs to know in order to solve this problem.

Note: No matter the age, the child will not be able to successfully move forward with this activity unless they are able to structure ten and the numbers up to 10.

Activity 5 Pose 2 digit and 2 digit subtraction problems. This activity is designed to use and discuss "jump strategies". Jump strategies are strategies that are linear; moving downward on the number line.

Example: **64 - 37** $64 - 30 \rightarrow 34 - 4 \rightarrow 30 - 3 \rightarrow 27$
38 - 17 $38 - 10 \rightarrow 28 - 7 \rightarrow 21$

Childs can record their strategies by using an empty number line.

Note: The 100 bead string is a good tool for jump strategies in subtraction. This tool does not lend to an understanding of tens and ones subtraction strategies.

(Tools for Tens and Ones Strategies in Subtraction – lollipop sticks)

Addition and Subtraction of 3 Digit Numbers
All of the above activities can also be done with 3 digit numbers using more than one bead string or finding a way to represent a bead string.

Rounding Two and Three Digit Numbers
Have the child create a number and then identify if the number is closer to either the decade before or the decade after.

Example: Child pushes over 37. Then identify if there are almost 40 beads or closer to 30 beads.   You can also put more than one bead string together to work with three digit numbers.