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# STUDENT WORKBOOK – LEVEL I

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**The Abacus Project**  
**Program Connections to Common Core State Math Standards**  
**and Standards for Mathematical Practices**

<b>Common Core State Standards for Mathematics Content</b>	
<b>K.CC.4</b>	Connect counting to cardinality.
<b>K.OA.5</b>	Fluently add and subtract within 5.
<b>K.NB.1</b>	Work with numbers 11 – 19 to gain foundations for place value.
<b>1.NBT.2</b>	Understand place value up to 2 digits.
<b>1.NBT.4</b>	Use place value understanding and properties of operations to add within 20 with concrete models.
<b>1.NBT.6</b>	Use place value understanding and properties of operations to subtract within 20 with concrete models.
<b>2.NBT.1</b>	Understand place value up to 3 digits.
<b>2.NBT.6</b>	Use place value understanding and properties of operations to add and subtract within 100.
<b>3.NBT.2</b>	Use place value understanding and properties of operations to add and subtract within 1000.
<b>4.NBT.1</b>	Generalize place value understanding for multi-digit whole numbers.
<b>4.NBT.4</b>	Fluently add and subtract multi-digit whole numbers using the standard algorithm.
<b>Common Core State Standards for Mathematical Practices</b>	
<b>MP.1</b>	Making sense of problems and persevere in solving them.
<b>MP.2</b>	Reason abstractly and quantitatively.
<b>MP.3</b>	Construct viable arguments and critique the reasoning of others.
<b>MP.4</b>	Model with mathematics.
<b>MP.5</b>	Use appropriate tools strategically.
<b>MP.6</b>	Attend to precision.
<b>MP.7</b>	Look for and make use of structure.
<b>MP.8</b>	Look for and express regularity in repeated reasoning.

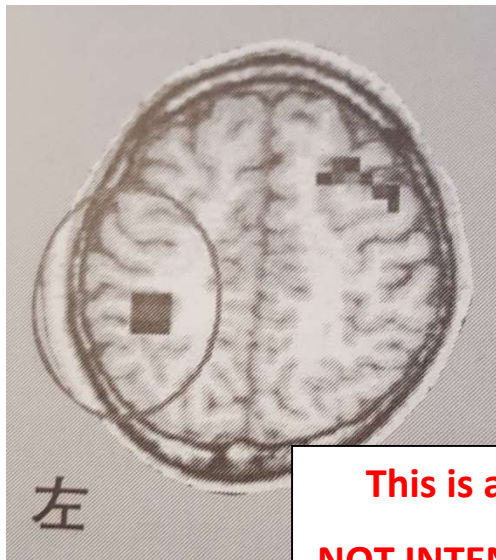


The soroban is like a calculator. Your fingers do the work!

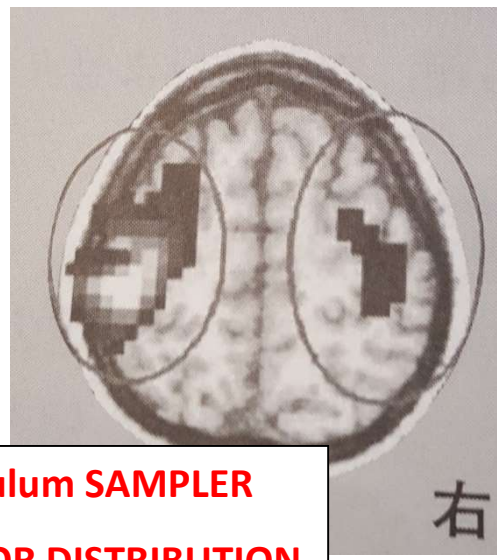


Using the soroban not only works your fingers, it works your brain, too.

brain using pencil/paper<sup>1</sup>



brain using the soroban<sup>1</sup>



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1. What do you notice?



## Let's make a soroban and learn how to use it.

What you'll need:

3 single craft sticks

3 double craft sticks

5 red beads, 5 yellow beads and 5 green beads

3 white rods

Glue



**Step 5:**

Place a dot on the middle craft stick where the red beads are. This represents the units or one's place. Very important to remember.

**Step 6 (optional):**

The red beads represent the 1's place.

The yellow beads represent the 10's place.

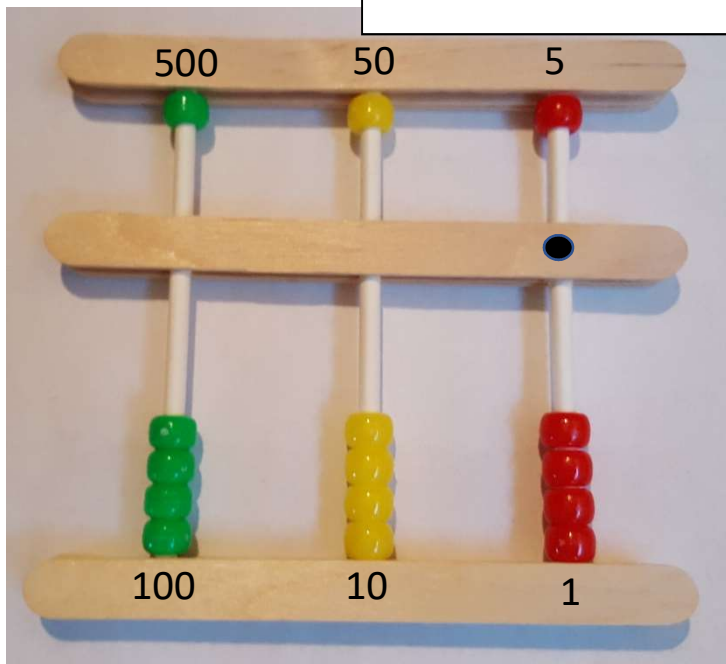
The green beads represent the 100's place.

There are beads at the top and bottom of the soroban.

The top beads are 5 beads and are worth more than the bottom beads.

You can mark your soroban to help you remember.

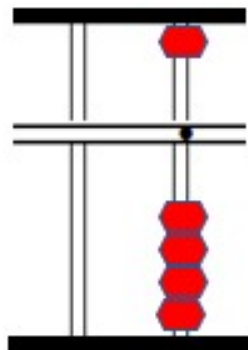
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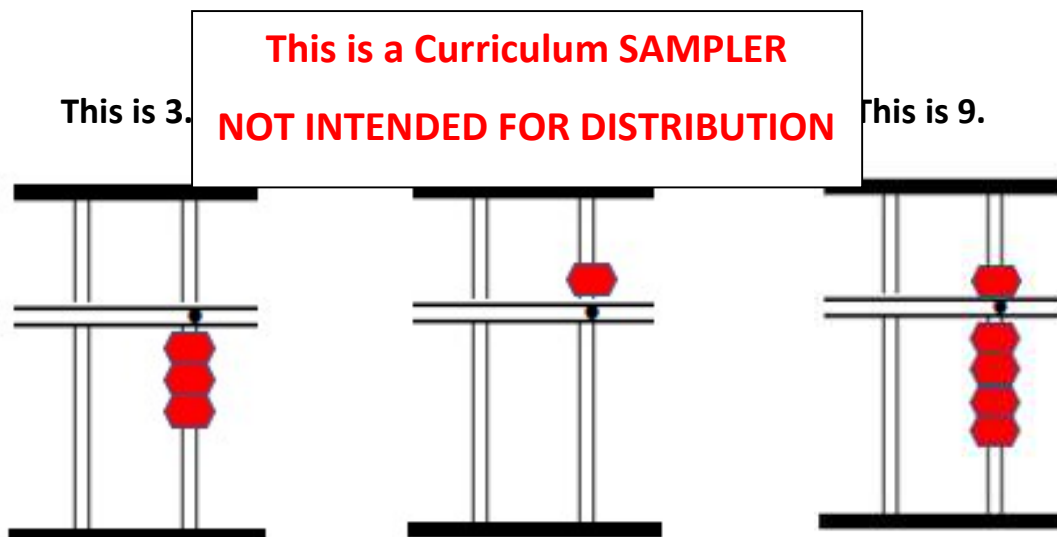
# The Counting Bar

To represent a number on the soroban, the beads have to touch the counting bar. The counting bar is the middle bar with the dot on it.

If no beads are touching the counting bar, the value is “0”. This means the bar is “clear” and ready for calculation.

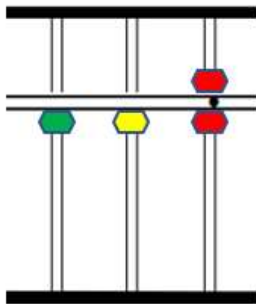


Here are some examples of numbers represented on the soroban.



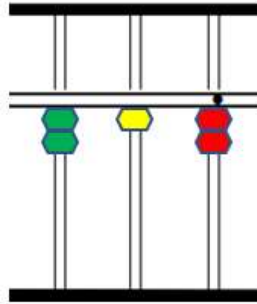
Introduction to 100s: Write the number represented on the soroban.

1.



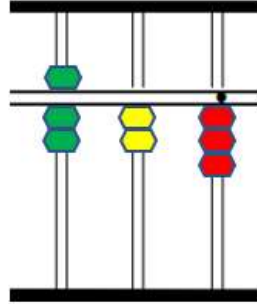
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2.



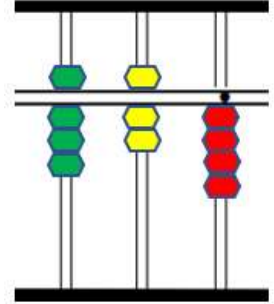
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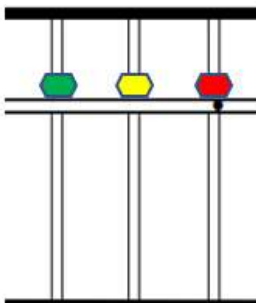
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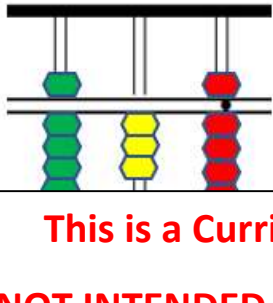
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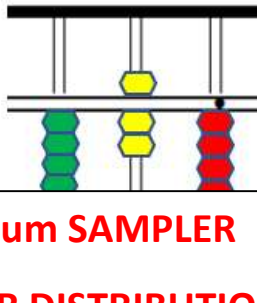
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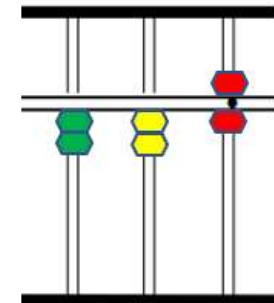
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7.



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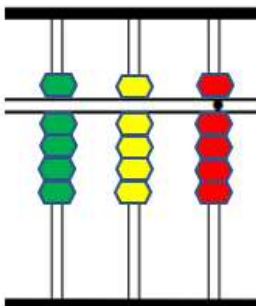
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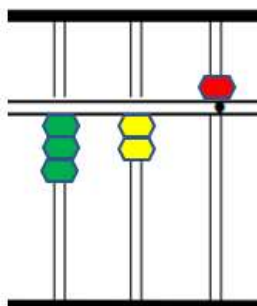
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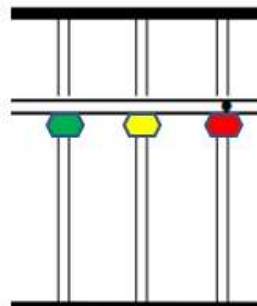
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10.



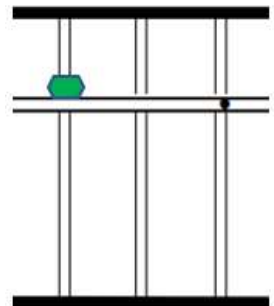
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11.



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12.

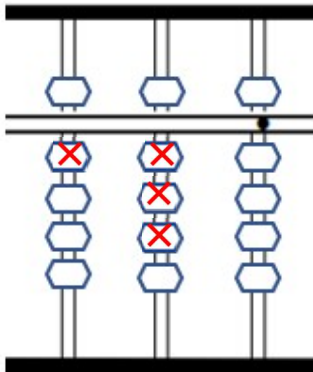


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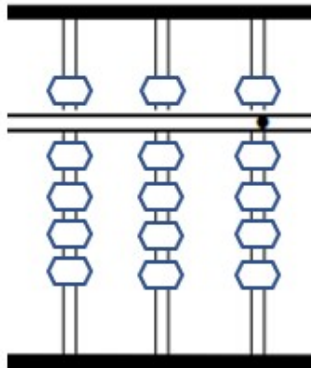
Draw an X on the bead(s) that represent the number.

1.



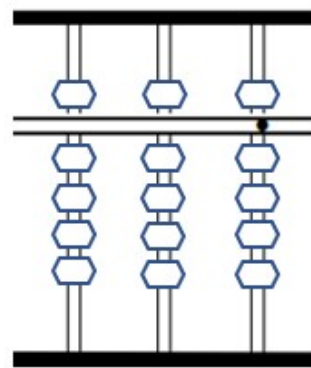
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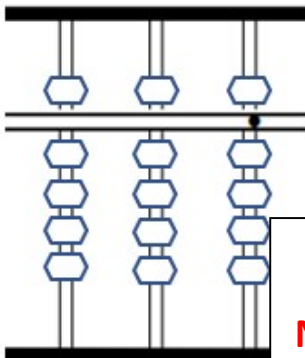
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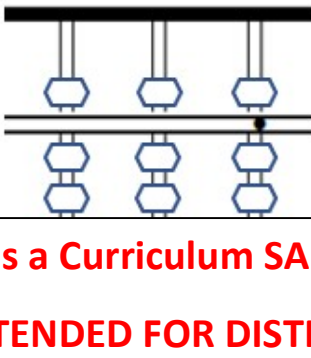
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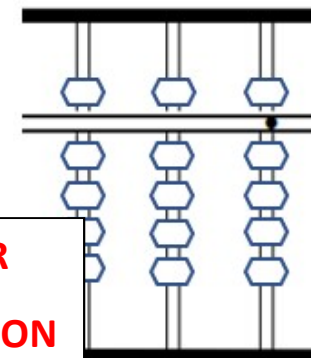
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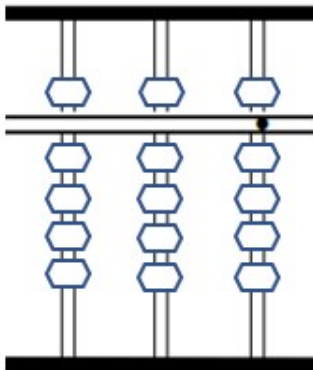
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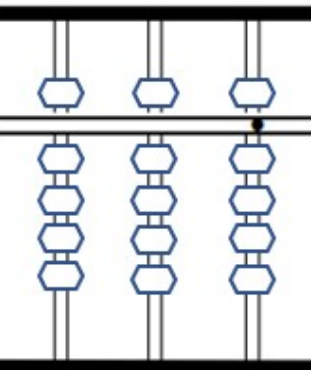
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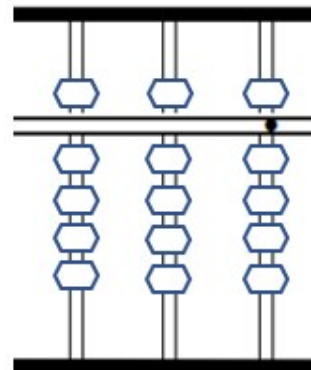
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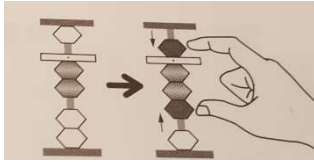


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# Pinch Technique Review



(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	1	2	1	11	22	12	11	12	20
7	6	6	6	61	17	26	78	70	11
1	1	1	2	26	60	60	10	17	68

(11)	(12)	This is a Curriculum SAMPLER NOT INTENDED FOR DISTRIBUTION						(8)	(19)	(20)
1	2							10	13	20
6	7							68	76	67
-2	-1	-2	-1	-3	-23	-12	-51	-55	-32	
-5	-2	-1	-1	-1	-15	-55	-25	-12	-50	

(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
9	8	9	8	9	87	99	89	96	79
-6	-7	-7	-6	-8	-76	-68	-69	-86	-77
1	3	2	2	3	32	11	23	24	31



### Competition Time!

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
9	3	8	4	9	24	79	68	74	99
4	9	5	3	3	68	14	53	42	45
8	4	7	9	9	43	82	97	95	73

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(11)	(12)							(19)	(20)
8	6	4	4	9	82	39	74	37	86
4	5	9	4	-6	49	85	52	94	-72
6	8	6	-5	8	26	72	-13	26	94
-7	-3	-8	9	4	-43	-64	69	-15	63

(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
7	8	9	2	4	63	49	34	84	29
5	4	8	9	4	56	73	43	39	65
9	3	4	7	8	42	64	95	63	38
6	-2	6	-4	-2	94	81	53	75	43
-4	9	-3	2	3	-21	-34	-12	-41	-34

