

Rashtriya Madhyamik Shiksha Abhiyan

Special Contribution by

Indian Institute of Vedic Mathematics & Abacus
New Delhi



1

VEDAS TO VINCULUM

2

ABACUS

Office of the State Project Office (SSA/RMSA)
Himachal Pradesh, Shimla-171001

Introduction

It gives me an immense pleasure to share that Indian Institute of Vedic Maths and Abacus - (IIVA) New Delhi, imparted 5 days training to 43 teachers of Government Schools of Himachal Pradesh in Abacus & Vedic Mathematics under RMSA. It is an eye opener experience & we look forward to inculcate this methodology in regular teaching pattern in our schools especially during readiness Programme in the beginning of session in all the secondary classes beginning from 6th to 10th.

I therefore pass on my best wishes to Indian Institute of Vedic math and Abacus - (IIVA) and TGT (Non Medical) of Himachal Pradesh and strongly recommend that these tactics may be propagated nationally and in the State for the benefits of students.

State Project Director (RMSA)
Shimla-1, Himachal Pradesh.

VEDAS TO VINCULUM

ऋग्वेदिक लघुलिपि?

1

JOURNEY THROUGH TEMPUS

Vedic Mathematics is

*a book written by the Indian Hindu priest jagadguru swami sri bharti
krishna tirtha ji*

(rediscovered from vedas between 1911 and 1918)

first published in 1965.

It contains a list of mental calculation techniques based on the vedas.

*The mental calculation system mentioned in the book is also known by
the same name or as "Vedic Maths"*

○ Vedic mathematics comprises “16 Sutras(formulae) & their subsutras(corollaries)

○ At doer's end:

doer has to identify and spot certain characteristics, patterns and then apply the sutra (formula) which is applicable there to

MEMENTOES

- Reduces silly mistakes
- Fastens the calculations
- Intelligent guessing
- Reduces burden
- Makes mathematics a bit of fun game for pupils

MULTIPLICATION BY 11 & ITS MULTIPLES

(Sub sutra anurupyena)

- Application of sutra is very easy
- Amazingly ; table of 11 is not required
- Just have to add digits in pairs

WORKING

$$2314 \times 11$$

Put single “o” in extreme left and extreme right of the multiplicand

$$023140$$

(Single naught sandwich)

Add the digits in pair starting from right to left

023140

$$02314+0 \quad (4+0=4)$$

$$0231+40 \quad (1+4=5)$$

$$023+140 \quad (3+1=4)$$

$$02+3140 \quad (2+3=5)$$

$$0+23140 \quad (0+2=2)$$

$$2314 \times 11 = 25454$$

0 23140

×11

2+0

3+2

1+3

4+1

0+4

25454



IF SUM OF 2 DIGITS OF MULTIPLICAND EXCEEDS "9"

When the sum exceeds 9 then carry the tens place digit & add to the preceding digit

$$2824 \times 11$$

Single naught sandwich = 028240

$$0 + 4 = 4$$

$$4 + 2 = 6$$

$$2 + 8 = 10 = \underset{1}{0}$$

$$8 + 2 = 10 = 10 + 1 = 11 = \underset{1}{1}$$

$$2 + 0 = 2 = 2 + 1 = 3$$

Product = 31064

MULTIPLICATION BY MULTIPLES OF 11 (22,33,44,55,66...)

- Multiply the multiplicand by the number of rank of the multiple

(e.g. 44 is 4th and 99 is 9th multiple so multiply the multiplicand by 4 or 9 in case we are multiplying by 44 or 99)

- Then apply the rule of multiplication by 11 to the product obtained (single naught sandwich)

WORKING

$$\begin{array}{r} 245 \\ \times 22 \quad (2 \times 11) \\ \hline 245 \times 2 = 490 \\ \hline 04900 \\ \hline \begin{array}{c} \swarrow \\ \searrow \\ \swarrow \\ \searrow \\ \swarrow \\ \searrow \\ \swarrow \\ \searrow \end{array} \\ 51390 \end{array}$$

MULTIPLICATION BY 111

3496

×111

(Add 2 **zeroes** to the extreme **right** and extreme **left** of the multiplicand)

Double Naught Sandwich

00 3496 00

Sandwiched Number=00349600

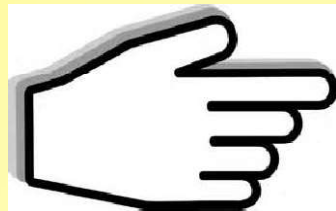
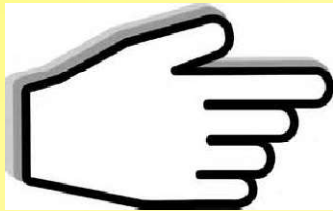
WORKING

3496

×₁₁₁

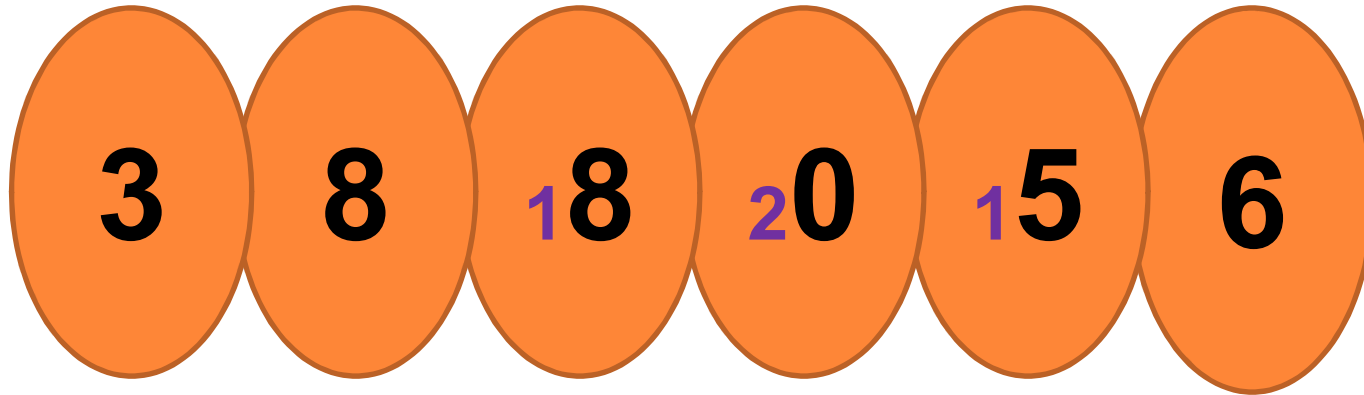
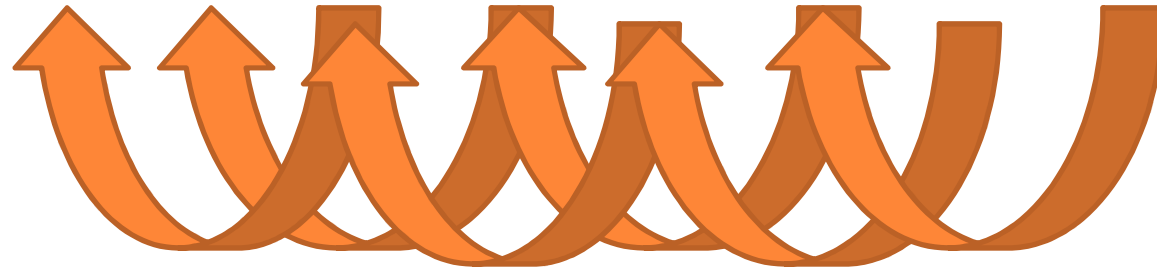
00349600

(Double naught sandwich)



add 3 digits at a time starting from right
to left

00349600



388056

MULTIPLICATION BY MULTIPLES OF 111 (222 TO 999)

- Find the rank of the multiple
(for 555 the rank is 5, for 777 the rank is 7 and so on)
- Multiply the multiplicand by the number of rank
- Apply the multiplication of 111 the product obtained

(Double Naught Sandwich Method)

WORKING

1348

× 222

(2 × 111)

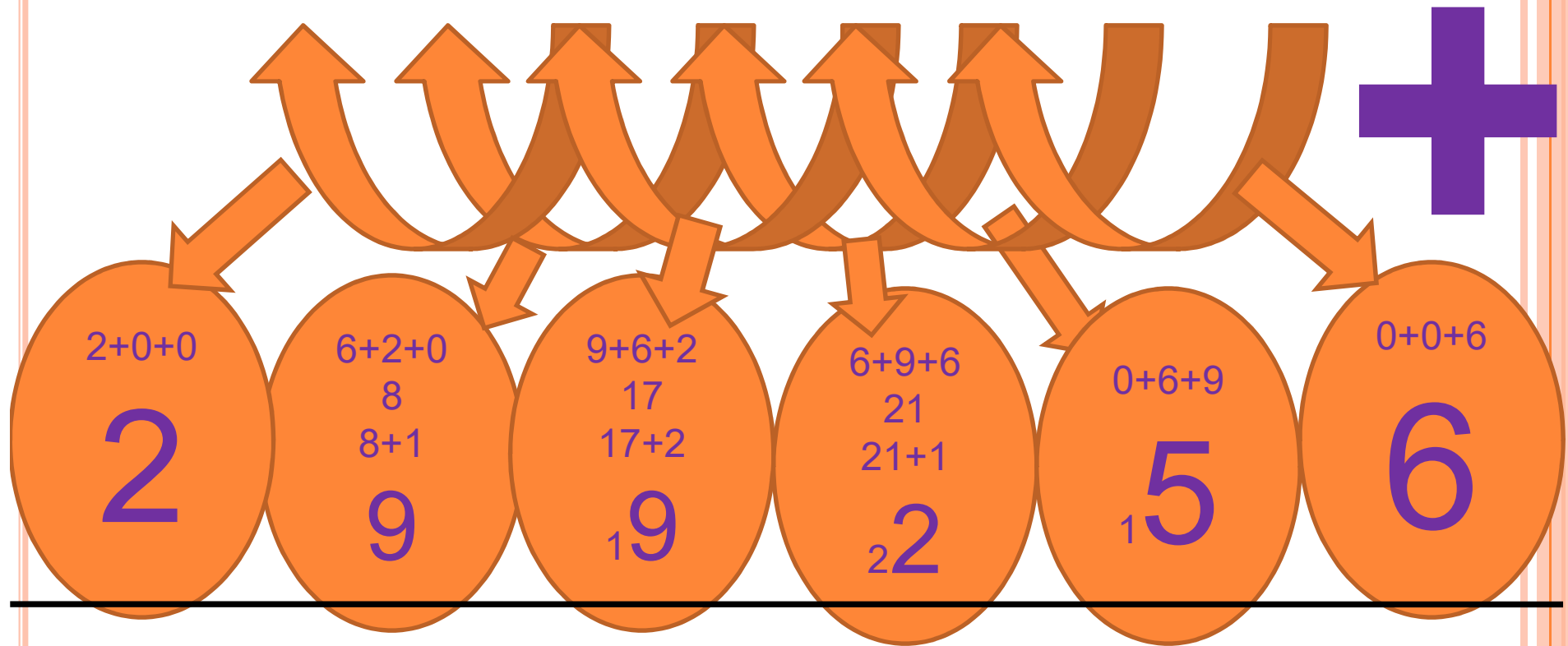
(2 × 1348)

00 2696 00

00269600

(Double Naught Sandwich)

00269600



299256

MULTIPLICATION BY 12 TO 19

(Sutra sopantyadvayamantya)

- sandwich the multiplicand between single zero
- Multiply each digit of the multiplicand by first digit of the multiplier from right to left and add to the immediate right digit following it one by one

WORKING

0 1 2 3 5 0

× 12

$$(2 \times 0) + 1 = 1$$

1

$$(2 \times 1) + 2 = 4$$

4

$$(2 \times 2) + 3 = 7$$

$$\underline{7} + 1$$

8

$$(2 \times 3) + 5 = 11$$

$$\underline{11} + 1$$

12

$$(2 \times 5) + 0 = 10$$

10

14820

SAME METHOD FOR 13 TO 19....

Practice the method for

$$2356 \times 15$$

$$2123 \times 16$$

MULTIPLICATION OF SPECIAL NUMBERS

“Antyayordasake’pi”

- *Sum of unit digits are ten & rest place digits are same*

$$\begin{array}{r} 67 \\ \times 63 \\ \hline \end{array}$$

- *Sum of ten’s place digits is ten & unit digits are same*

$$\begin{array}{r} 22 \\ \times 82 \\ \hline \end{array}$$

WORKING 67×63

- Multiply the unit digit & write the product in two digits on one's & ten's place
 - Multiply the ten's place digit with its successor

$$\begin{array}{r} 67 \\ \times 63 \\ \hline \end{array}$$

$$(7 \times 3 = 21)$$

$$(6 \times 7 = 42)$$

$$4221$$

$$\begin{array}{r} 22 \\ \times 82 \\ \hline \end{array}$$

- Multiply the unit digits & write the product in two digits, one's & ten's place
- Multiply the ten's place digits & add one "unit digit" then put in hundred's & thousand's place

$$\begin{array}{r} 22 \\ \times 82 \\ \hline \end{array}$$

$$(2 \times 2 = 04)$$

$$[(8 \times 2) + 2]$$

$$1804$$

PRACTICE THE METHOD..

$$\begin{array}{r} 58 \\ \times 52 \\ \hline \end{array}$$

$$\begin{array}{r} 75 \\ \times 35 \\ \hline \end{array}$$

ENDEAVOUR

- Gaurav Raj (TGT N/M)

GHS Dakahal Edu. Block: Kotkhai Distt.
Shimla

- Yogesh Kumar (TGT N/M)

GHS Samleu Edu. Block Banikhet Distt.
Chamba

- Sunita Bindra (TGT N/M)

GSSS Tutu Distt Shimla

*Exploration
continues...*



ABACUS



GENERAL OBJECTIVES

- TO IMPROVE CONCENTRATION.
- TO IMPROVE MEMORY.
- TO GENERATES SELF CONFIDENCE AND IMPROVES PROFICIENCY.
- TO IMPROVE BRAIN DEVELOPMENT.

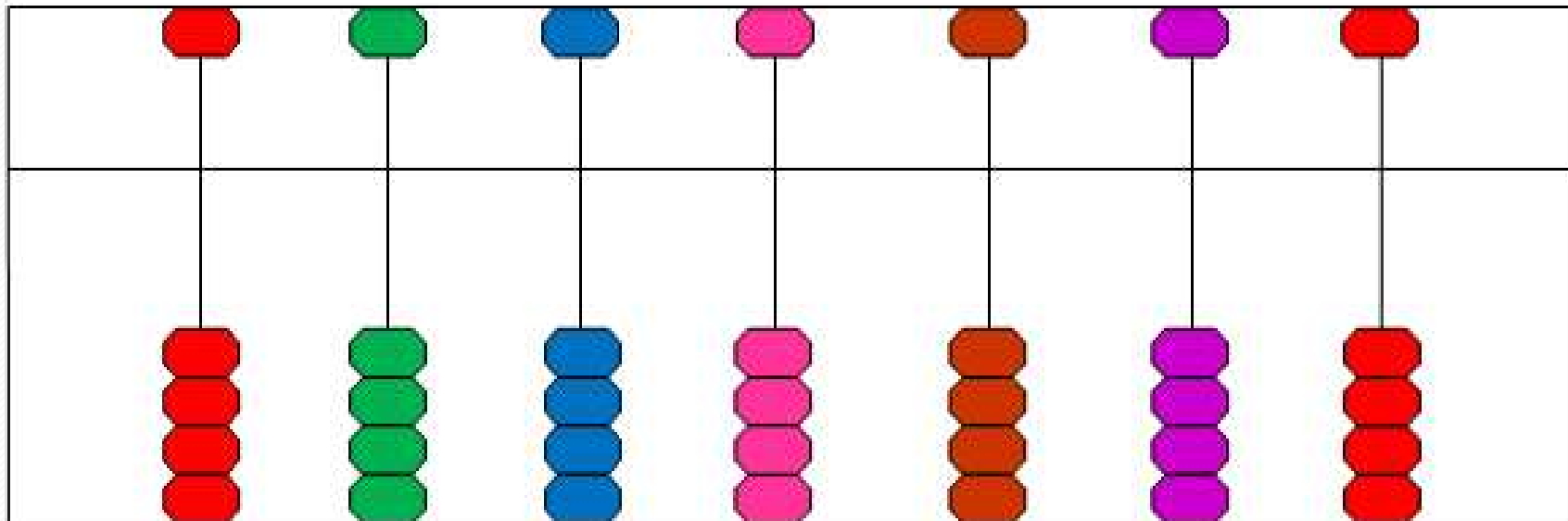


INTRODUCTION

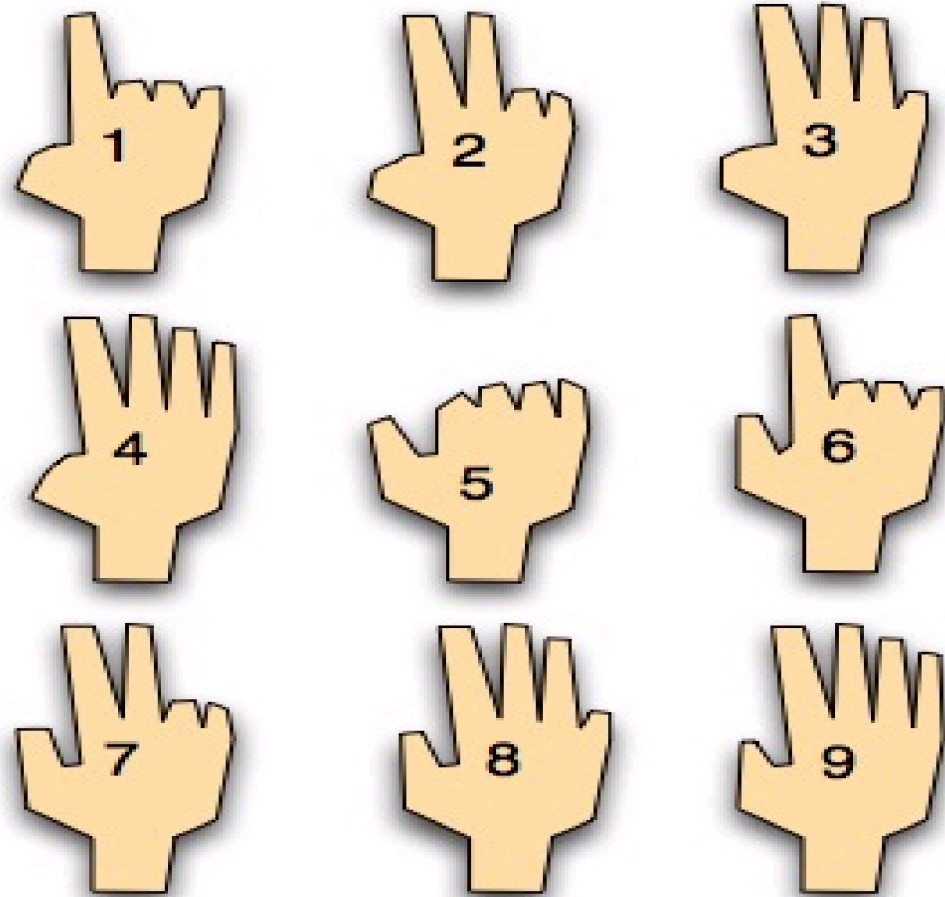
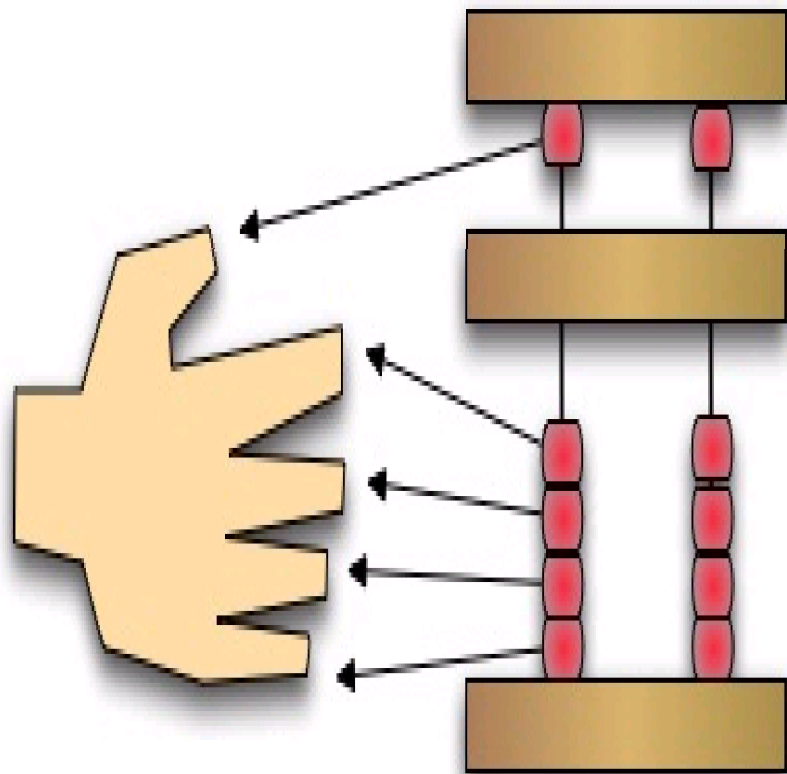
- *Abacus is a latin word that has its origin from greek word ABAX or ABAKON, meaning table or tablets.*
- *The abacus also called a counting frame, is a calculating tool that was in use in Japan, China and Russia.*
- *ABACUS is used for multiplication, division, addition, subtraction, square root and cube root operations at high speed.*
- *ABACUS is used for visual articulation and teach maths.*

ABACUS DEVICE

Million Rod	Hundred Thousand	Ten Thousand	Thousand Rod	Hundred Rod	Tens Rod	Units Rod
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Finger Counting

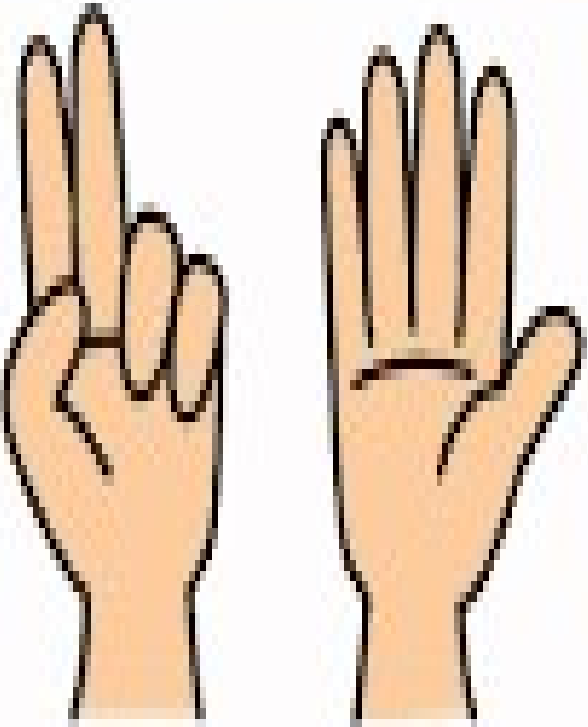


29

04:00

70

85



65

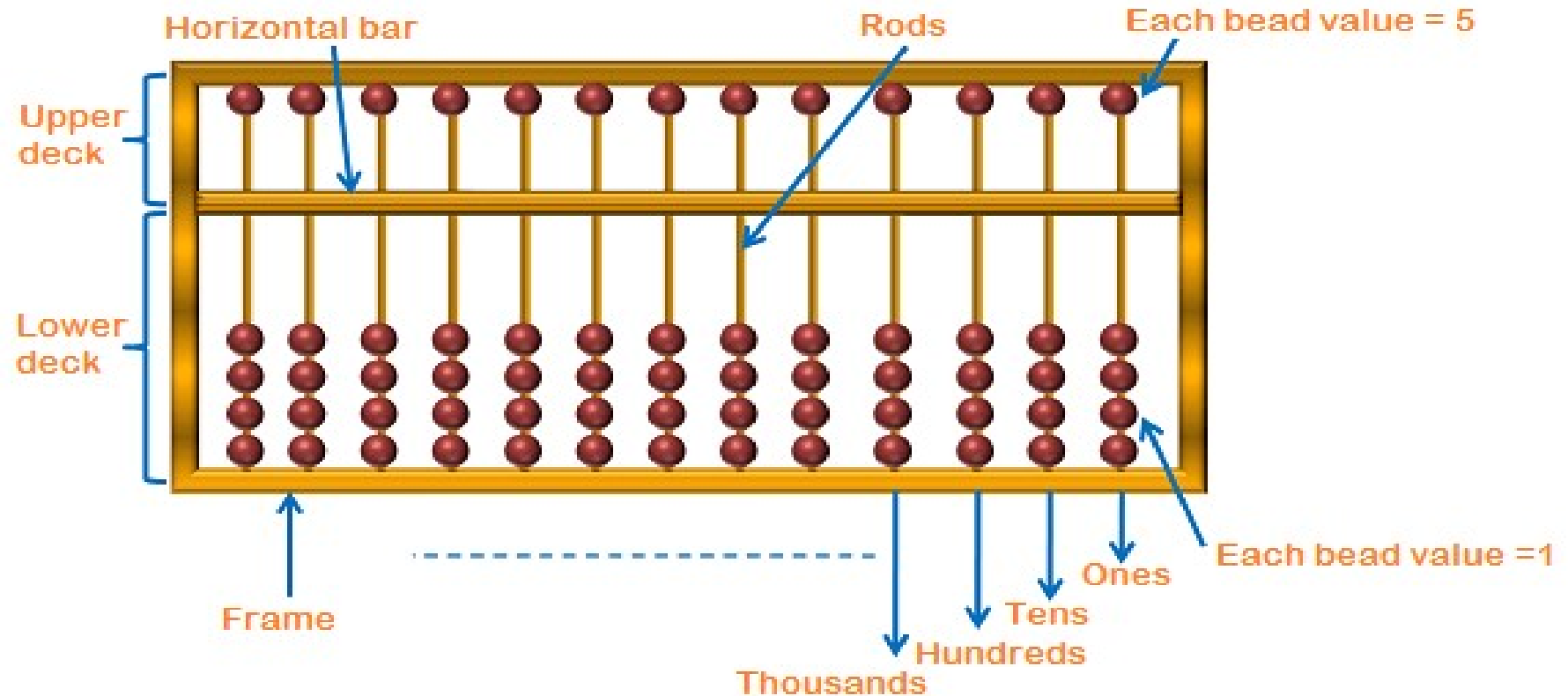
04:00

70

85



Abacus beads value



Abacus based on 4 Topics :-

1. Without Compliments.
2. 5's compliments.
3. 10's compliments.
4. Mixed compliments.

Without compliments :-

- *Without compliments means direct sums. We can calculate the sum without using any formula.*

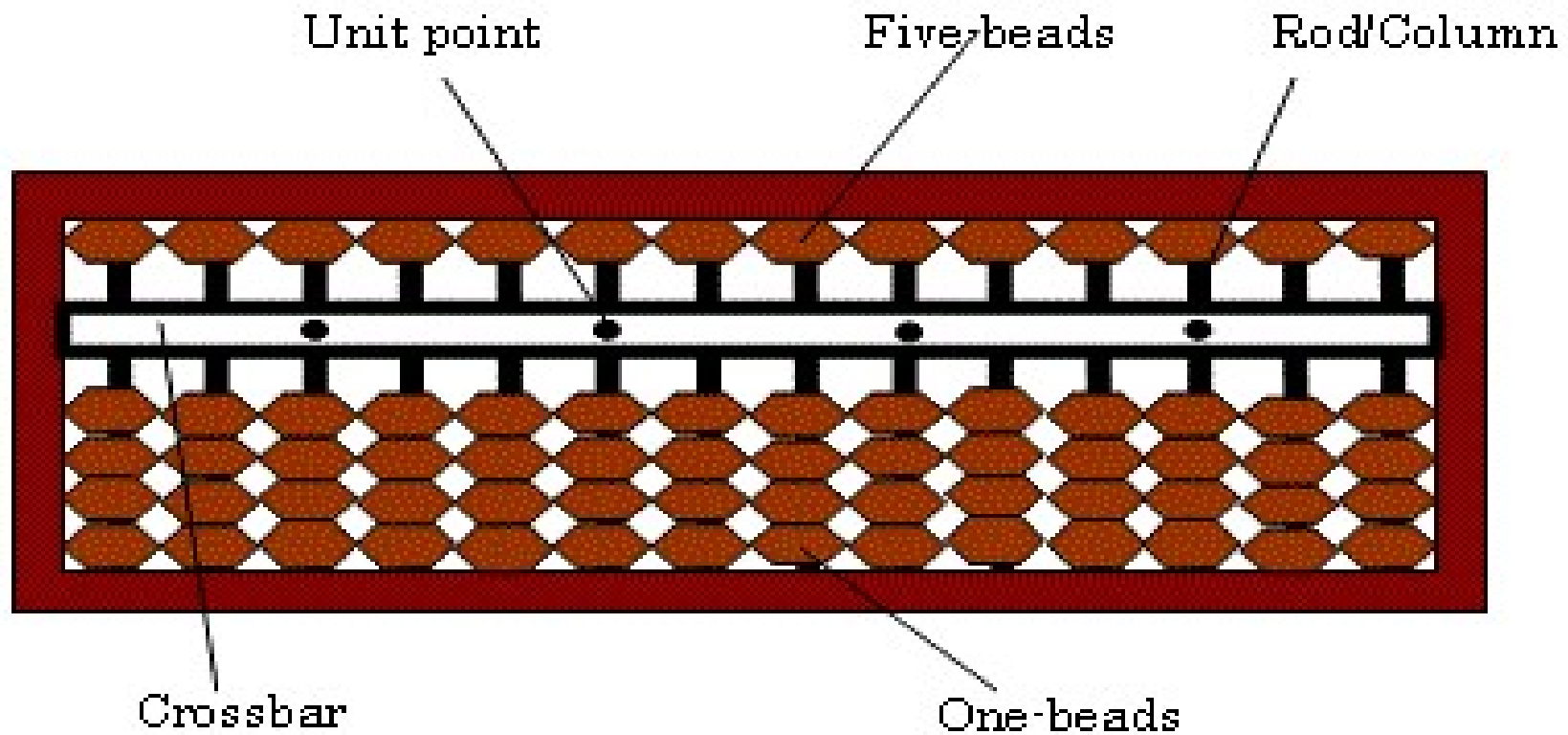
Steps for without compliments:-



Step -1

- To clear abacus i.e. to show zero on abacus with pinch.
- When all beads are on their respective position, the value shown is zero.

Zero value on ABACUS

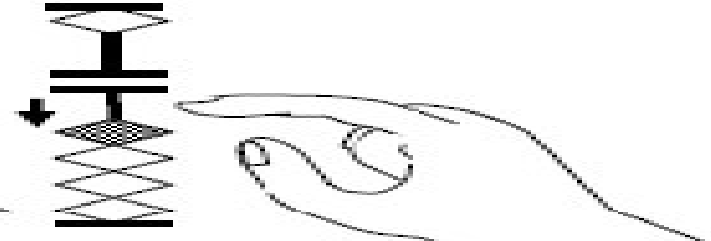


- ***Left hand's thumb and index finger to operate the abacus tool.***

move up 1, move down 1

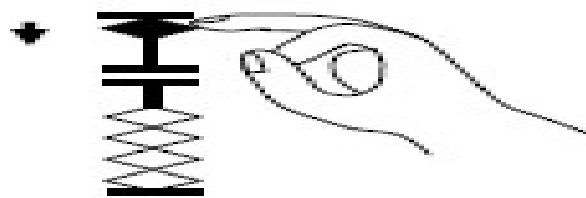


**1) Thumb :
move up 1**

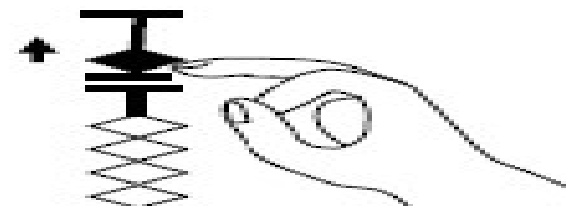


**2) Forefinger :
move down 1**

move up 5, move down 5



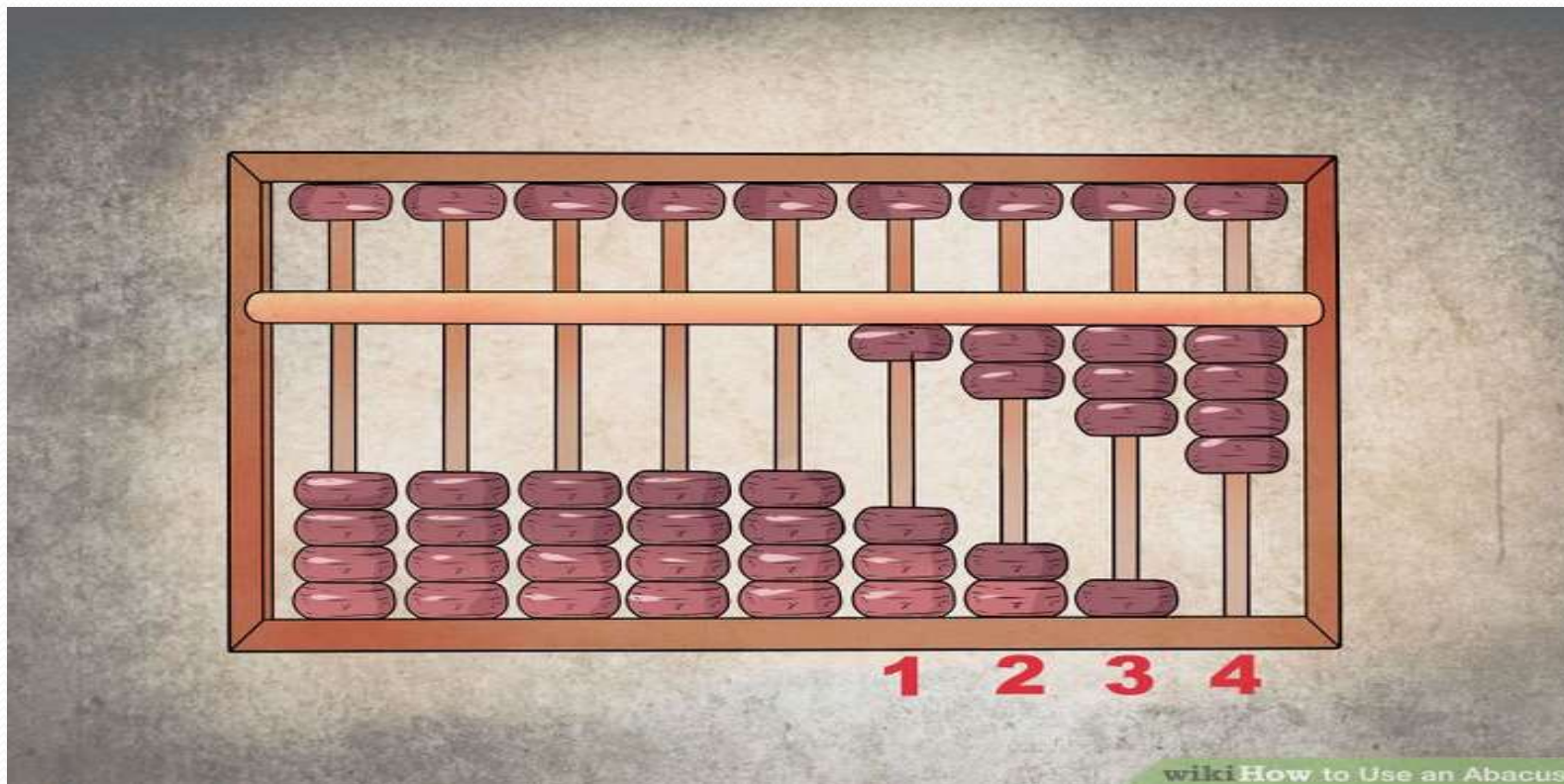
**1) Middle finger :
move up 5**



**2) Middle finger :
move down 5**

Addition:-

- For adding, take the beads towards value bar. (when beads are available)



Example of Addition :-

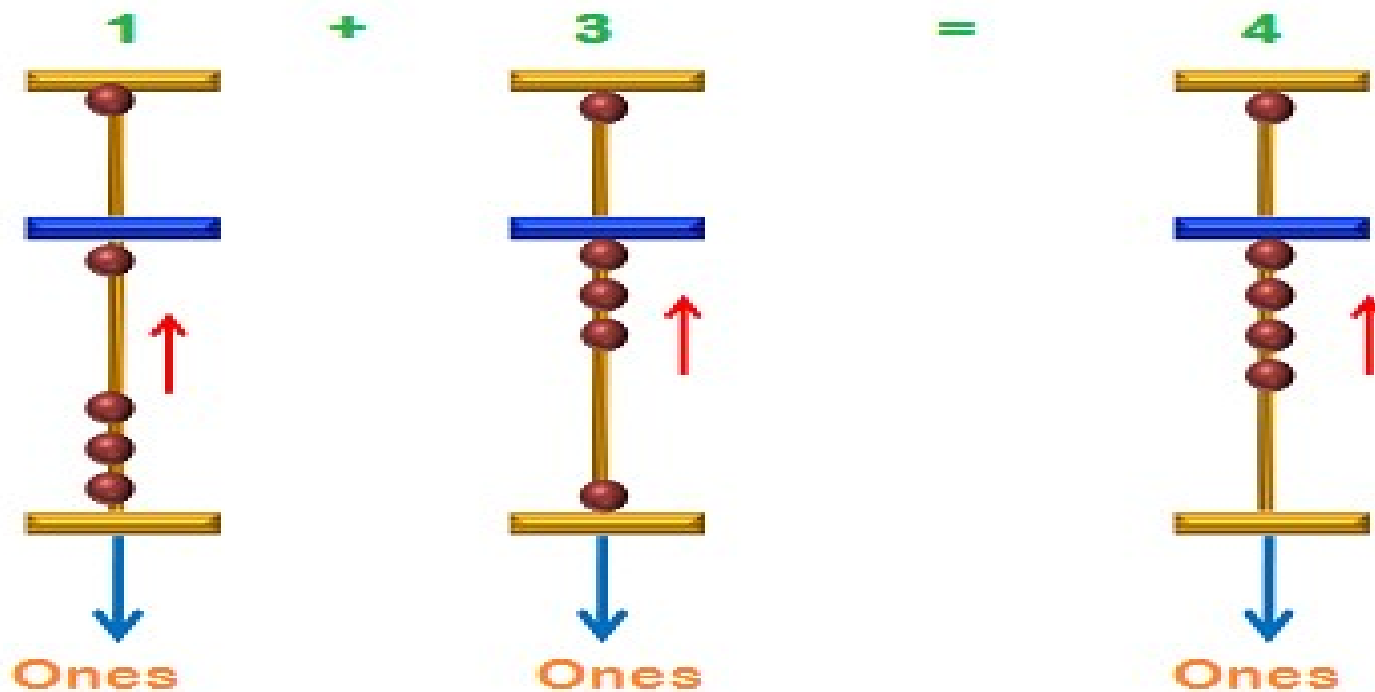


Fig: Addition of single digit numbers using abacus

Practice Sums (without compliments)

(a)

8

1

-6

-1

(b)

7

2

-9

2

(c)

3

-2

2

1

(d)

4

-1

3

1

Subtraction:-

- For subtraction take the beads away from value bar. (When beads are available)

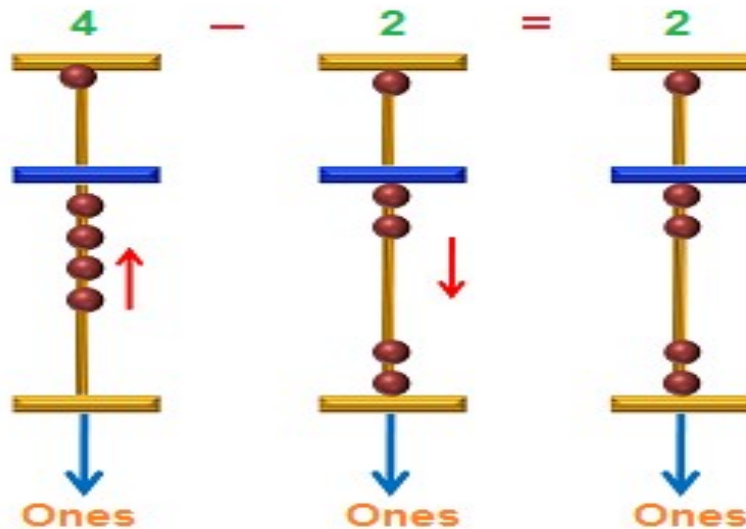


Fig: Subtraction of one digit numbers using abacus

5's compliments.

- 5's compliments are used when beads are not available for addition or subtraction of digits 1,2,3 & 4.
- *For example if we want to add 1 in 4 beads that is not possible without complication method for that we have to use 5's compliments.*

Compliments of 5's (+)

- For making 5
- 1 is friend of 4
- 2 is friend of 3
- 3 is friend of 2
- 4 is friend of 1

Compliments

$$+1 = +5 - 4$$

$$+2 = +5 - 3$$

$$+3 = +5 - 2$$

$$+4 = +5 - 1$$

Compliments of 5's (-)

- For making 5
- 1 is friend of 4
- 2 is friend of 3
- 3 is friend of 2
- 4 is friend of 1

Compliments

$$-1 = +4 - 5$$

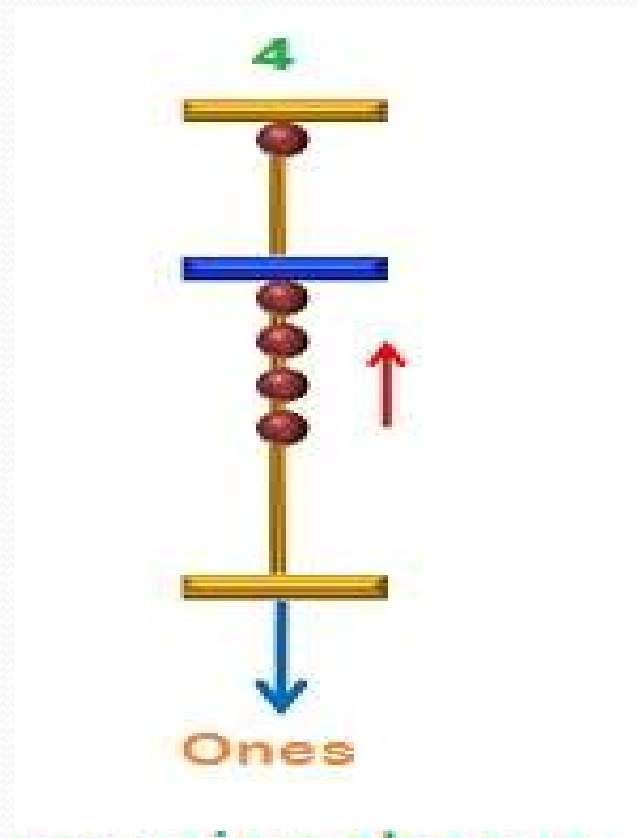
$$-2 = +3 - 5$$

$$-3 = +2 - 5$$

$$-4 = +1 - 5$$

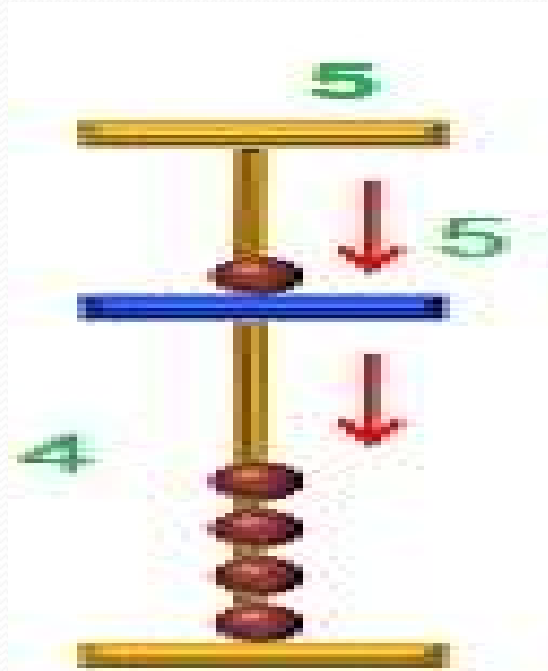
Step :- 1

- Take 4 beads towards the value bar.



Step :- 2

- For adding 1 use compliments $+5-4$ brings bead down with index finger and remove four lower beads with index finger.
- The rod represents 5 as answers (so answer to question $4+1 = 5$).



Practice Sums (with 5's compliments)

(a)

4

1

1

(b)

5

-1

-1

(c)

5

-2

2

(d)

4

2

-2

10's compliments

- 10's compliments are used when beads are not available for adding directly then we use 5's compliments and if beads are not available to use 5 compliments even then we use 10's compliments
- For example if we want to add 1 in 9 beads that is not possible without complication method and five compliments method for that we have to use 10's compliments.

Compliments of 10's (+)

- For making 10
- 1 is friend of 9
- 2 is friend of 8
- 3 is friend of 7
- 4 is friend of 6
- 5 is friend of 5
- 6 is friend of 4
- 7 is friend of 3
- 8 is friend of 2
- 9 is friend of 1

Compliments

$$+1 = -9 + 10$$

$$+2 = -8 + 10$$

$$+3 = -7 + 10$$

$$+4 = -6 + 10$$

$$+5 = -5 + 10$$

$$+6 = -4 + 10$$

$$+7 = -3 + 10$$

$$+8 = -2 + 10$$

$$+9 = -1 + 10$$

Compliments of 10's (-)

- For making 10
- 1 is friend of 9
- 2 is friend of 8
- 3 is friend of 7
- 4 is friend of 6
- 5 is friend of 5
- 6 is friend of 4
- 7 is friend of 3
- 8 is friend of 2
- 9 is friend of 1
-

Compliments

$$-1 = -10 + 9$$

$$-2 = -10 + 8$$

$$-3 = -10 + 7$$

$$-4 = -10 + 6$$

$$-5 = -10 + 5$$

$$-6 = -10 + 4$$

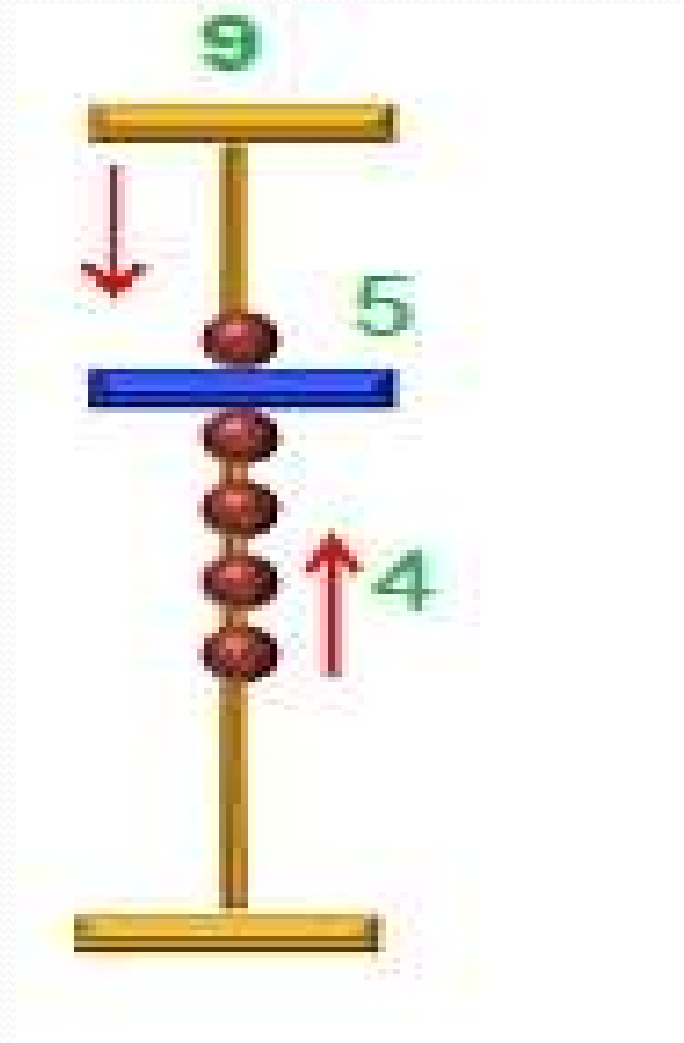
$$-7 = -10 + 3$$

$$-8 = -10 + 2$$

$$-9 = -10 + 1$$

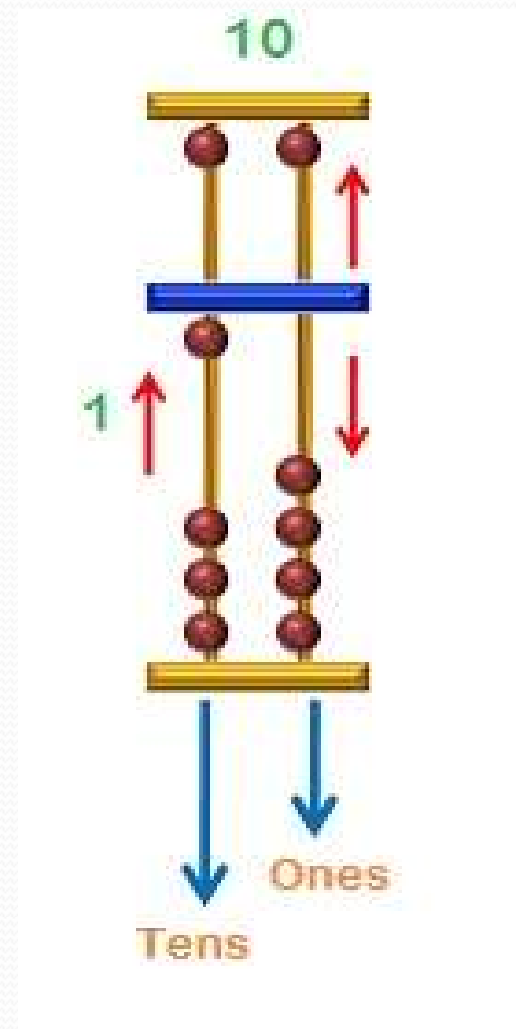
Step :- 1

- Take 9 beads towards the value bar with pinch in method .



Step :- 2

- For adding 1, 10's compliments will be used. First remove 9 (as 9 is a friend of 1) rod with pinch out method and bring 1 bead up with thumb on rod B (10's).
- The rod represents 10 as answers (so answer to question $9+1 = 10$).



Practice Sums (with 10's compliments)

(a)

9

1

-1

(b)

8

-2

-2

(c)

7

-3

3

(d)

6

3

3

Mixed compliments.

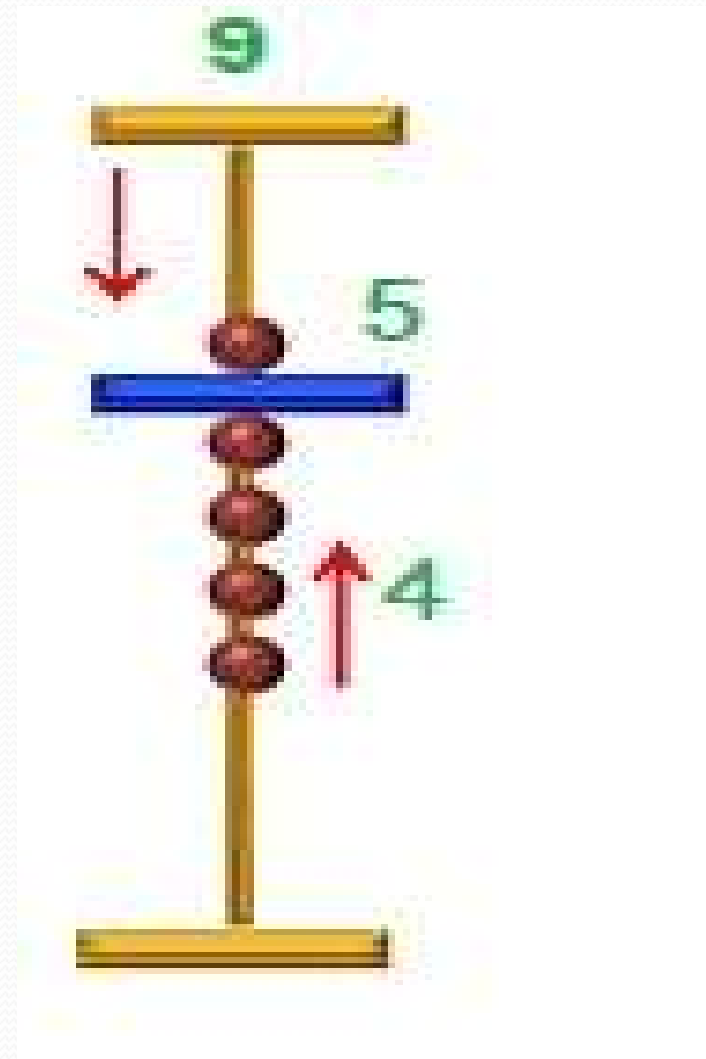
- Mixed compliments are used specially for adding and subtracting numbers 6,7,8 and 9. In case where these number cannot be added or subtracted directly and with the 10's compliments, then the mixed compliments will be used. For Applying mixed compliments for addition 5 should be on value bar.

Example :-

- For example if we want to add 6 in 5 beads that is not possible without compliment method , 5's compliments method and 10's compliments method for that we have to use mixed compliments method.
- $5 + 6 = 11$

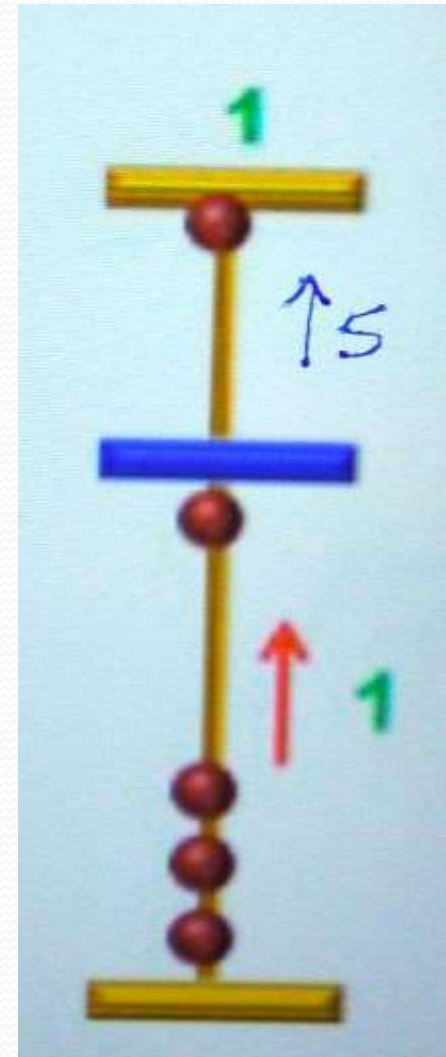
Step :- 1

- Take 5 beads towards the value bar.



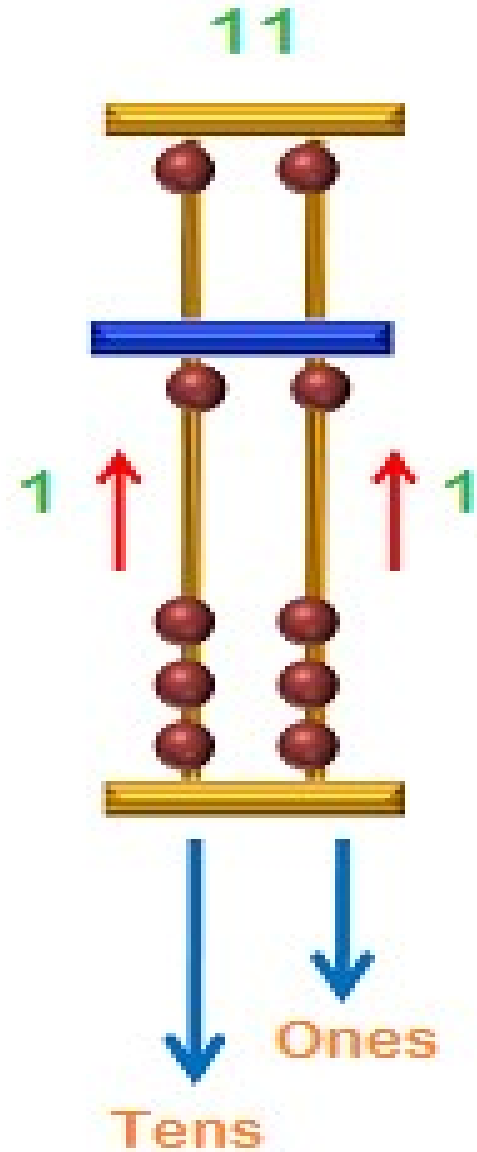
Step :- 2

- Remove or subtract 5 with left index finger and add 1 with left hand thumb in unit rod.
- Add 1 bead on rod with the help of left thumb.



Step 3

- The rod represents 11
- as answer(so answer to
- question $5+6 = 11$).



Presented by:

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- Sh. Sandeep TGT (N.M) GMS Narogi u/c GSSS Bhunter (kullu)
- Sh. Govind Thakur TGT (N.M) GHS Sari (kullu)
- Sh. Jag jeevan Pal TGT (N.M.) GSSS Nirmand (kullu)

SIEMAT
HIMACHAL PRADESH



TENDER BOX
MVI SHIMLA

THANK YOU

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10	MANOJ KUMAR	TGT(N.M)	GHS Chansu	Sangla	Kinnaur	9418189663
11	NAROTAM KASWAL	TGT(N.M)	GHS Panvi	Nichar	Kinnaur	8628057955
12	ASHWANI KUMAR	TGT(N.M)	GSSS Urni	Nichar	Kinnaur	9459854431
13	HARISH KUMAR	TGT(N.M)	GSSS Sangla	Sanla	Kinnaur	9625193477
14	GOVIND THAKUR	TGT(N.M)	GHS Sari	Banjar	Kullu	9625384400
15	JEET	Lec Maths	GSSS Bajaura	Bhunter	Kullu	9418412323
16	SANDEEP	TGT(N.M)	GMS Narogi	Bhunter	Kullu	9805420657
17	JAI SINGH	TGT(N.M)	GMS Grahana	Anni	Kullu	9418352917
18	JAGJEEVAN PAL	TGT(N.M)	GSSS Nirmand	Nirmand	Kullu	9418206200
19	VISHAL GUPTA	PGT(Maths)	GSSS Jahlman	Udiapur	L&S	9418075349
20	KULDIP DOGRA	TGT(N.M)	GMS Khangsar	Kalong	L&S	9418952821
21	JAI PAL	PGT(Maths)	GSSS Malang	Keylong	L&S	9459044357
22	HAKAM CHAND RANA	TGT(N.M)	GSSS paplog	Sarkaghat	Mandi	9418164902
23	SATISH KUMAR	TGT(N.M)	GMS Nagrota	Baldwara	Mandi	8627831801
24	LALIT KUMAR	TGT(N.M)	GSSS Dehar	Sun Ngr	Mandi	9817282456
25	DILA RAM VERMA	TGT(N.M)	GSSS Kapahi	Sun Ngr	Mandi	8988223756
26	SHILPI THAKUR	TGT(N.M)	GHS Nandi	Chachi	Mandi	8988152870
27	SUNITA BINDRA	TGT(N.M)	GSSS Totu	Shimla	Shimla	9418075556
28	GAURAV RAJ	TGT(N.M)	GHS Dakahal	Kotkhai	Shimla	9816973545
29	NIRUPAMA DHANJAL	TGT(N.M)	DIET Shimla	Shimla	Shimla	9418113131
30	BALBIR SHARMA	TGT(N.M)	GSSS Bandhi Dhadar	Shilai	Sirmour	9816429508
31	DEEP RAM SHARMA	TGT(N.M)	GSSS Haripurdhar	Sirmaur	Sirmour	9805490841
32	DEVRAJ THAKUR	TGT(N.M)	GHS Nihog	Sirmaur	Sirmour	9459027430
33	Dr. ANJEEV KUMAR	TGT(N.M)	GMS Rugra	Solan	Solan	9418248604

34	KANHIYA LAL SHARMA	Lec(Maths)	DIET Solan	Solan	Solan	9418003036
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37	NEERAJ SAINI	TGT(N.M)	GSS Bhadsali	Haroli	Una	8894692890
38	ANUJ KUMAR	TGT(N.M)	GMS Barsara	Una	Una	9418495244
39	RAJ KUMAR	TGT(N.M)	GMS sapouri	Una	Una	9816012408
40	SATISH KUMAR	TGT(N.M)	GSSS Saroh	Bangana	Una	8628855073