



THE OHIO STATE UNIVERSITY

Mathematics Teacher Institute: Day 2

Mathematics Teaching Institute, July 27-31, 2015

Sponsored by **Ohio** | Department
of Education



What If We Don't Use Place Value?



Roman numerals are based on seven symbols

Symbol	Value
I	1
V	5
X	10
L	50
C	100
D	500
M	1,000

- (1) I placed before V or X indicates one less, so four is IV (one less than five) and nine is IX (one less than ten).
- (2) X placed before L or C indicates ten less, so forty is XL (ten less than fifty) and ninety is XC (ten less than a hundred).
- (3) C placed before D or M indicates a hundred less, so four hundred is CD (a hundred less than five hundred) and nine hundred is CM (a hundred less than a thousand).



1	I	21	XXI	41	XLI	61	LXI	81	LXXXI
2	II	22	XXII	42	XLII	62	LXII	82	LXXXII
3	III	23	XXIII	43	XLIII	63	LXIII	83	LXXXIII
4	IV	24	XXIV	44	XLIV	64	LXIV	84	LXXXIV
5	V	25	XXV	45	XLV	65	LXV	85	LXXXV
6	VI	26	XXVI	46	XLVI	66	LXVI	86	LXXXVI
7	VII	27	XXVII	47	XLVII	67	LXVII	87	LXXXVII
8	VIII	28	XXVIII	48	XLVIII	68	LXVIII	88	LXXXVIII
9	IX	29	XXIX	49	XLIX	69	LXIX	89	LXXXIX
10	X	30	XXX	50	L	70	LXX	90	XC
11	XI	31	XXXI	51	LI	71	LXXI	91	XCI
12	XII	32	XXXII	52	LII	72	LXXII	92	XCII
13	XIII	33	XXXIII	53	LIII	73	LXXIII	93	XCIII
14	XIV	34	XXXIV	54	LIV	74	LXXIV	94	XCIV
15	XV	35	XXXV	55	LV	75	LXXV	95	XCV
16	XVI	36	XXXVI	56	LVI	76	LXXVI	96	XCVI
17	XVII	37	XXXVII	57	LVII	77	LXXVII	97	XCVII
18	XVIII	38	XXXVIII	58	LVIII	78	LXXVIII	98	XCVIII
19	XIX	39	XXXIX	59	LIX	79	LXXIX	99	XCIX
20	XX	40	XL	60	LX	80	LXXX	100	C

Symbol	Value
I	1
V	5
X	10
L	50
C	100
D	500
M	1,000

<http://www.roman-numerals.org/chart100.html>



Counting and Place Value



Counting in English

1 one	11 eleven	21 twenty one
2 two	12 twelve	30 thirty
3 three	13 thirteen	100 one hundred
4 four	14 fourteen	101 one hundred one
5 five	15 fifteen	
6 six	16 sixteen	
7 seven	17 seventeen	
8 eight	18 eighteen	
9 nine	19 nineteen	
10 ten	20 twenty	



What about other languages?

Construct a similarly structured table for any language you know – no internet searching – to the best of your recollection.

1 one	11 eleven	21 twenty one
2 two	12 twelve	30 thirty
3 three	13 thirteen	100 one hundred
4 four	14 fourteen	101 one hundred one
5 five	15 fifteen	
6 six	16 sixteen	
7 seven	17 seventeen	
8 eight	18 eighteen	
9 nine	19 nineteen	
10 ten	20 twenty	



Counting in Chinese

1 yi	11 shi yi	21 er shi yi
2 er	12 shi er	100 yi bai
3 san	13 shi san	101 yi bai ling yi
4 si	14 shi si	
5 wu	15 shi wu	
6 liu	16 shi liu	
7 qi	17 shi qi	
8 ba	18 shi ba	
9 jiu	19 shi jiu	
10 shi	20 er shi	



Counting in Turkish

1 bir	11 onbir	21 yirmi bir
2 iki	12 ?	30 thirty-otuz
3 üç	13 ?	100 uz
4 dort	14 ?	101 ?
5 bes	15 ?	
6 alti	16 ?	
7 yedi	17 ?	
8 sekiz	18 ?	
9 dokuz	19 ?	
10 on	20 ?	



Counting in Japanese

1 ichi	11 juichi	21 nijuichi
2 ni	12 juni	100 hyaku
3 san	13 jusan	101 hyakuichi
4 shi	14 jushi	
5 go	15 jugo	
6 roku	16 juroku	
7 shichi	17 jushichi	
8 hachi	18 juhachi	
9 kyu	19 jukyu	
10 ju	20 niju	

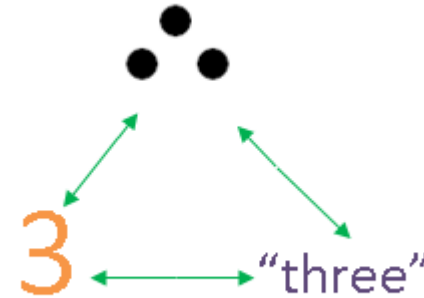


Counting in Farsi

- 1 = yek
- 2 = do
- 3 = seh
- 4 = chahaar (Bookish); chaahr (Common)
- 5 = panj
- 6 = shesh (Commonly shish)
- 7 = haft
- 8 = hasht
- 9 = noh
- 10= dah
- 11= yaz dah (commonly "yaazda")
- 12= da-vaaz dah (commonly "davaazda")
- 13= siz dah (commonly "sizda")
- 14= chahaar dah
- 15= panz dah (Commonly poonz dah or poonzdeh)
- 16= shanz dah
- 17= hev dah
- 18= hij dah (Bookish hej dah)
- 19= nooz dah
- 20= bist
- 21= bist o yek
- 22= bist o do
- 23= bist o seh
- 30= si
- 31= si o yek
- 40= chahal



Young learners need to develop word (spoken word)-symbol-quantity relationships





How can we enable early elementary grades learners to develop understandings of the word-symbol-quantity relations for single-digit numbers and for values 10 and more?



Application



**What are your favorite
place-value activities?**



Sharing and Planning

Refer to materials you brought or activities you use for counting and/or place-value activities.

- What makes them effective?
- What makes them challenging
- What are the essential aspects that cannot be changed?



Represent on Posters

Use papers – can divide and share

Briefly identify and then summarize/
represent this activity.

What are the key attributes?



Exploring “Depth of Knowledge”

Implications for assessment

Implications for instruction and learning activities

Developmental considerations



Extending Why Questions and Depth of Knowledge in K-5

Using Tasks from your Curriculum materials



**“Shop” for
activities you
will use!**



**Tell us about an
activity you
learned about.**