

DOCUMENT RESUME

ED 216 522

FL 012 892

AUTHOR Masciantonio, Rudolph; And Others
 TITLE The Numbers in Latin. Teacher's Guide. Tentative Edition.
 INSTITUTION Philadelphia School District, Pa. Office of Curriculum and Instruction.
 PUB DATE 82
 NOTE 40p.
 LANGUAGE English; Latin

EDRS PRICE MF01/PC02 Plus Postage.
 DESCRIPTORS Audiolingual Methods; *Cultural Awareness; Elementary Secondary Education; *Etymology; *Latin; Lesson Plans; *Numbers; Second Language Instruction; Semantics; Teaching Guides; Word Study Skills

ABSTRACT

This guide is intended to assist Latin and English teachers who have some background in Latin to expand the English vocabulary and reading skills of students through the study of Latin roots, prefixes, and suffixes. The lessons on numbers in Latin are designed to be presented through an audiolingual approach. The introductory material in the guide provides general notes on the teaching of Latin in the Philadelphia School District, suggestions for scheduling and staffing the Latin classes, an outline of the organization of each lesson, some general hints to the teacher, and an overview of the material to be taught in this unit. The presentation of the material is organized in nine lessons, each one containing objectives, exercises, explanatory material, and word games. The appendix is an explanation of the ancient method of counting. (AMH)

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THE NUMBERS IN LATIN

TEACHER'S GUIDE

TENTATIVE EDITION

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FOREWORD

This guide is intended to assist Latin teachers and English teachers with background in Latin to expand the English vocabulary and reading skills of pupils through the study of Latin roots, prefixes and suffixes.

Recent research in various parts of the country has shown the significantly positive effect of the study of Latin on the vocabulary and reading skills of pupils of all backgrounds and abilities. Over 65% of the words in English come from Latin either directly or indirectly, including most literary and scientific terminology. Latin roots, prefixes, and suffixes provide the key to unlocking the meanings of these words. In addition, the inflected nature of the Latin language affords pupils the opportunity to acquire a linguistic perspective that is helpful in learning English.

This guide also is designed to familiarize pupils with aspects of classical culture and its impact; to introduce orally some basic Latin; and to stimulate interest in the study of languages and the Humanities in general.

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Gratitude is also expressed to classes and teachers throughout the school
district who assisted in field testing various drafts of these materials.

The assistance of Dr. Alexander Tobin, Director of Mathematics Education
for the School District, and Dr. Robert Murphey, Supervisor of Mathematics
Education, in the development of these materials is also gratefully
acknowledged.

Pierre St. Germain, Illustrator for the Division of Foreign Language Education,
designed the cover and other art work in the Guide.

INTRODUCTION

I: GENERAL NOTES ON TEACHING LATIN IN THE PHILADELPHIA SCHOOL DISTRICT

The major goals for the teaching of Latin in The School District of Philadelphia have been stated as follows by the Latin and Greek Curriculum Committee and the K-12 Foreign Language Curriculum Committee:

1. To teach pupils to understand, speak, read, and write Latin within an appropriate cultural context.
2. To widen the cultural horizons of the pupils, especially through comparing the classical past with our own world and through showing the relationship between our world and that of the ancient people.
3. To extend the verbal functioning of the pupils in English, especially through vocabulary building based on Latin roots and affixes.
4. To foster interest in the study of classical and modern languages and the Humanities in general.

Other goals are:

1. To develop an appreciation of the relationship between Latin and other foreign languages, especially the Romance languages.
2. To improve the self-concept of pupils by giving them the opportunity to study a subject area with which they might not otherwise identify.

To aid in the accomplishment of these goals certain basic principles have been postulated regarding Latin instruction. These principles, together with the goals listed above, constitute School District policy on Latin instruction.

1. Latin programs must be geared to the needs of all children -- not just the academically talented or the college bound.
2. Latin teaching must be multisensory, lively, dramatic, enthusiastic, and creative. Pupils must be fully involved in the learning process.
3. Aural-oral work must be emphasized since this tends to heighten student interest and leads ultimately to a more natural and facile reading ability. Listening and speaking should always precede reading and writing.
4. Emphasis should be given to usage and to practice in the structure of the language as opposed to minute grammatical analysis.
5. Extending the English verbal functioning of pupils, especially by relating English words to their Latin roots and affixes, should form a major part of the Latin program. Attention should be given to contrastive study of the structures of Latin and English.

6. Comparing and contrasting classical culture with our own and tracing the influence of the past on the present should be emphasized.

II UTILIZATION OF THE GUIDE

A. Scheduling

This guide may form part of a minicourse or "course-within-a-course" on Word Power through Latin. The scheduling patterns that may be used for such a minicourse or "course-within-a-course" are very flexible; some workable possibilities include:

- one class period (circa 45 minutes) per week for an entire school year devoted to Word Power through Latin
- two class periods per week for a semester devoted to Word Power through Latin
- five class periods per week for one or two months devoted to Word Power through Latin
- a portion of almost every class period (e.g. 20 minutes) for an entire school year devoted to Word Power through Latin

The guide may also form part of the basis of a completely separate course (either a major or minor) called Word Power through Latin.

The guide may be used with pupils in grades 7-12 who have not necessarily studied any Latin previously. It may be used with pupils of all backgrounds and abilities.

B. Staffing

The guide may be used by a Latin teacher as part of a Latin course.

An English (or Reading or Language Arts) teacher with some background in Latin could also utilize the guide as part of the English course. Conceivably teachers in other fields may find the guide useful. Secondary school English teachers who are participants in the Language Arts through Latin project receive supportive help from the Division of Foreign Language Education. Secondary School English teachers who are not already participants in the Language Arts through Latin project and who wish to use this guide with their classes are urged to join the project. For details contact the Division of Foreign Language Education.

C. Articulation with Other Materials

This guide is part of a group of curriculum materials designed to build the English vocabulary and reading skills of secondary school pupils. The guide may be used before or after the other components of the group or completely independently of them. To date the following materials have appeared:

- Word Power through Latin: A Curriculum Resource
- The Numbers in Latin
- Star Trek with Latin
- Græco-Roman Sports and Games
- Latin the Language of Health Sciences

A guide on Legal Latin is also being planned. The teacher who uses this guide should also be aware of portions of the elementary school Latin curriculum materials which deal with English vocabulary development. These include:

- Look for the Latin Word: A Gamebook on English Derivatives and Cognates to Accompany How the Romans Lived and Spoke
- Latin the Key to English Vocabulary: A Gamebook on English Derivatives and Cognates to Accompany Voces de Olympo

With adaptations it is possible to use the above listed elementary school materials with secondary school pupils just as parts of the secondary school Word Power through Latin materials may be adopted to elementary school pupils.

D. Organization of Each Lesson

Each lesson is conceived of as approximately 45 minutes of instruction for an average secondary school class. Naturally some classes will require more time and some less. In general thorough mastery of what is covered is preferable to simply "covering" material without mastery.

Each lesson specifies what can be taught (objectives) and how to teach it (activities). In a way the teacher is provided with a step-by-step recipe for accomplishing the objectives of each lesson. The teacher at first may wish to follow the "recipe" very closely. Later, of course, adaptations in the activities (and in the objectives of the lessons) may be made. All adaptations, however, should be made within the framework of the general notes on teaching Latin in the Philadelphia School District given

at the beginning of this introduction.

Latin utterances (quotations, dialogues, phrases) appearing in the guide are to be introduced orally. Teachers should let the pupils hear these utterances and then have them repeat them chorally and individually. Reading and writing these utterances should come only as a third and fourth step after understanding and speaking. In other words a strict four skills or audio-lingual or aural-oral-lecto-graphical approach is envisioned.

The same audio-lingual approach is to be used for the teaching of English derivatives and cognates. Hearing and speaking should always precede reading and writing.

Wordgames which are included in the guide in general should be reproduced so that each pupil receives a copy. Due to shortages in paper and breakdowns in duplicating machines in the schools, teachers may prefer to treat the copies of the wordgames as non-consumable items.

The guide ends with a unit review which enables the teacher to gauge how well pupils have mastered the content.

E. General Hints to the Teacher

The following list of helpful hints for using this guide was drawn up as a result of field testing:

1. Be sure to adhere to the audio-lingual approach. Presenting the four language skills (listening comprehension, speaking, reading, and writing) distinctly and in proper order will provide required re-entry for pupils. It is also a more natural way to acquire knowledge of a first or second language.
2. Be sure to appeal to as many of the senses of pupils as possible. A talking teacher is not enough, --- no matter how engaging or interesting. Use visual cues (where appropriate), charts, the chalkboard, and other realia. Get the pupils physically involved in the learning process as much as possible.
3. Be enthusiastic about your subject!
Your enthusiasm will be contagious!
4. Get the pupils involved in enrichment projects of various kinds. Pupils can be asked to make posters illustrating etymological relationships or illustrating quotations and proverbs introduced in the course of the unit or illustrating cultural concepts.
5. Give emphasis to the usage of new English derivatives and cognates. Get the pupils using the derivatives and cognates in sentences.

6. Relate what is taught in the Word Power through Latin unit to the rest of the curriculum whenever appropriate. Invite pupils to use etymological principles, for example, in learning new vocabulary in any subject. Encourage them to become aware of the impact of the classical heritage in such areas as art, literature, music, history, and science.
7. Be sure to intersperse choral and individual response in your teaching. Pupils need the practice and security that choral response and repetition provide. They also need to be heard individually so that the teacher can assess their efforts and provide individualized help.
8. Be sure that material placed on and copied from the chalkboard is accurate. Teachers should supervise carefully the transcription of material by pupils.

F. An Overview of the Material To Be Taught in This Unit

1. Counting in Latin from 1-10; Latin utterances connected with mathematical processes; other selected numbers in Latin
2. English derivatives and cognates connected with the above
3. Cultural information relating to the Latin utterances

LESSONS FOR THE NUMBERS IN LATIN

(1)

LESSON 1

Objectives


1. To teach pupils the following Latin utterances:

Numerate mecum: Unus, duo, tres, quattuor, quinque, sex, septem, octo, novem, decem.	Count with me: One, two, three, four, five, six, seven, eight, nine, ten.
---	--

2. To introduce the following English derivatives and cognates from unus:
union, united, unicorn, unisex, unique, uniform, unison, univocal,
unicellular, unilateral

Suggested Activities

1. Tell pupils that they are going to learn to count from one to ten in Latin. Using fingers or other objects corresponding to the numbers, count in Latin for the pupils. Have them repeat each number. The Latin direction Repetite omnes ("Repeat, everybody") may be used to encourage repetition. Have individual rows repeat the numerals and then individual pupils. You may start with a few numbers at a time, e.g., unus, duo, tres. Then gradually add others.
2. Invite pupils to sing the following Latin song to the tune of "Ten-Little Indians".

Unus, duo, tres Romani; quattuor, quinque, sex Romani; septem, octo, novem Romani, et decem Romani	
---	---

The Latin introduction Cantemus carmen "Unus, duo, tres Romani" ("Let's sing the song "One, two, three Romans") may be used to start the song.

3. Write the following Roman numerals on the chalkboard:

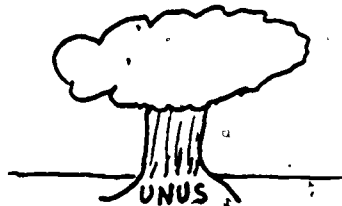
I II III
IV V VI
VII VIII IX X

Using a long pointer elicit the Latin word for each numeral in rapid fire fashion. Increase speed as recognition improves. You may wish to tell pupils that IV is sometimes written IIII and that IX is sometimes written VIIII.

4. Placards (each bearing a Roman numeral from I to X) may be distributed to ten pupils. Announce that a Latin digital computer will solve any problem in addition, subtraction, multiplication, and division up to a total of ten. Seated pupils throw out computation problems in Latin. Numbers used in the computations are held out at waist level. The answer is held up over head level and shouted out in Latin. Teach the following expressions by usage:

plus = "plus" sunt = "equals"
minus = "minus" et = "and"
multiplicatum per = "multiplied by"
divisum per = "divided by"

5. Put a word tree on the chalkboard with the root unus thus:



Invite pupils to suggest English derivatives and cognates from unus. Some possibilities are: union, united, unicorn, unisex, unique, uniform, unison, univocal, unicellular, unilateral. Have pupils echo these words chorally and individually. Discuss the meanings, derivatives and cognates and have pupils use them orally in sentences. Then insert derivatives and cognates into word tree. Many other derivatives and cognates may be related to unus. If time permits the teacher may want to treat these. Pupils may confuse the English prefix un- ("not") for the root unus. The teacher may explain the difference in sound, viz., un- ("not") is a short u sound in English whereas words from unus ("one") have a long u sound in English.

6. Have pupils copy the word tree and then construct a derivative/cognate chart in three columns thus:

ENGLISH DERIVATIVE OR COGNATE	LATIN ROOT	MEANING OF ENGLISH DERIVATIVE OR COGNATE
union	unus "one"	the act or state of being one
united	unus "one"	joined together as one
unicorn	unus "one"	mythical animal with one horn
unisex	unus "one"	not distinguished on the basis of sex; applying to both male and female
unique	unus "one"	being the only one of its kind
uniform	unus "one"	a outfit of one kind

unison	unus "one"	saying the same words simultaneously by two or more speakers
univočal	unus "one"	having only one meaning or one voice
unicellular	unus "one"	having one cell
unilateral	unus "one"	one-sided

LESSON 2

Objectives

1. To review counting to ten in Latin and Roman numerals I to X
2. To explain the origin of Roman numerals
3. To make pupils aware of the similarity between the numbers one to ten in Latin and in Romance languages

Activities

1. Put the Roman numerals I to X on the chalkboard. Have the pupils count in Latin in rapid fire fashion several times
2. Use the "discovery method" to explain the origin of the Roman numerals. You might ask the following questions and supply answers as necessary:
 - a. What part of the body would people naturally use to count?
[Answer: the fingers]
 - b. What do you think is the origin of the Roman numeral I?
[Answer: It represents one finger, just as II represents two fingers, and III, three fingers]
 - c. What hand configuration does V represent?
[the opening between the thumb and all the other four fingers held pressed together. V thus represents all five fingers of one hand.]
 - d. What do you think IV represents?
[one less than five]
 - e. How is X related to V?
[X is simply two V's with their angles touching.]

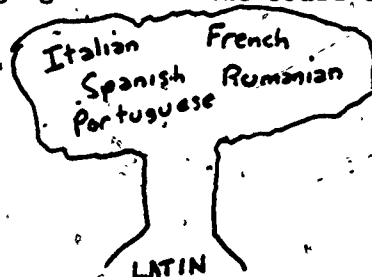
Point out that finger counting was a highly developed art.

The fact that human beings have 10 fingers was probably responsible for the importance of 10 in our numbers system.

You may point out that the Latin word for finger is digitus which is the source of such English words as "digit" and "digital" finger signs were used by the ancients to denote arithmetical operations just as they are used today in Oriental bazaars.

In Roman schools the children were taught arithmetic by means of the abacus or counting board, a device still used in China. This board was constructed of wood and marked off by ridges or grooves in compartments, along which balls, counters, or buttons could be moved. The Roman abacus was a copy of the Greek and was similarly used. The Appendix of this Guide contains additional information on the abacus that may be discussed with the pupils.

3. Ask the pupils if they can name the chief Romance languages. You might put the language tree on the board thus:



Explain that the Romance languages are those directly descended from that of Rome, viz, Latin. English is not a Romance language but has taken most of its vocabulary from Latin. Explain that the relationship between Latin and the Romance languages becomes evident in comparing the numbers 1 to 10. Distribute the following chart:

LATIN	ITALIAN	FRENCH	SPANISH	PORTUGUESE	RUMANIAN	ENGLISH
unus	uno	un	uno	um	un	one
duo	due	deux	dos	dois	doi	two
tres	tre	trois	tres	trez	trei	three
quattuor	quattro	quatre	cuatro	quatro	patru	four
quinque	cinque	cinq'	cinco	cinco	cinci	five
sex	sei	six	seis	seis	sesse	six
septem	sette	sept	siete	sete	septe	seven
octo	otto	huit	ocho	oito	opt	eight
novem	nove	neuf	nueve	nove	noua	nine
decem	dieci	dix	diez	dez	zece	ten

Ask the following questions:

1. Can anyone pronounce the numbers in Spanish? In Italian? In French?
2. Which numbers seem most similar to Latin? Which seem most different? [There may be various opinions and answers]

3. Why do you think the Latin originals changed into the Romance forms?
 [When the Roman Empire was conquered by barbarian invaders, differences in the Latin spoken in the various sections of the Roman Empire developed. When modern means of transportation and communication were lacking people were shut off from each other, and it was easy for differences of speech to develop.]
4. What prevents English from evolving into several languages the way Latin evolved into the Romance languages?
 [Modern means of communication and transportation keep people in various parts of the English-speaking world in close touch. Regional differences develop, but they do not become so great as to endanger mutual intelligibility.]

LESSON 3

Objectives

To introduce the following derivatives and cognates:

duality, duarchy, duodecagon, duplicity, trefoil, triceps, trilateral, trium, quadriplemic, quadruped, quadrangle, quadrant, quintet, quinquennial, quintillion, quinate

Activities

1. Have pupils count from one to ten in Latin using the direction Numerate mecum! Have them sing Unus Duo Tres Romani using the direction Cantemus carmen "Unus Duo Tres Romani".
2. Discuss each derivative and cognate below in terms of its etymology and meaning. Have pupils echo each derivative and cognate orally. Have each derivative and cognate used in a sentence. After oral control has been acquired put the chart on the chalkboard and have pupils copy it.

ENGLISH DERIVATIVE OR COGNATE	LATIN ROOT	MEANING OF ENGLISH DERIVATIVE OR COGNATE
duality	duo "two"	state of being two
duarchy	duo "two"	rule by two
duodecagon	duo "two" decem "ten"	a twelve-sided figure
duplicity	duo "two"	double dealing
trefoil	tres "three"	a three-leafed clover
triceps	tres "three"	a muscle having three heads located in the back of the upper arm
trilateral	tres "three"	three-sided

triune	tres "three" unus "one"	three in one
quadriplegic	quattuor "four"	paralytic who has lost use of all four limbs
quadruped	quattuor "four"	four-footed animal
quadrangle	quattuor "four"	a four-angled plane figure
quadrant	quattuor "four"	a quarter of any area
quintet	quinque "five"	a group of 5 voices or instruments
quinquennial	quinque "five"	happening every five years or lasting five years
quinate	quinque "five"	arranged in fives; having 5 similar parts

3. Ask the following questions:

- a. What does the trefoil used by Fidelity Bank look like?
- b. How many limbs is a quadriplegic unable to use?
- c. Why is God sometimes described as triune?
- d. Why is the Jackson Five called a quintet?
- e. Is the school yard a quadrangle?
- f. Is it a quadrant?
- g. What and where is the triceps?
- h. Why would an agreement between China, Nigeria, and Great Britain be called a trilateral agreement?
- i. How many sides does a duodecagon have?
- j. Why are politicians criticized for their duplicity?
- k. What is meant by the duality of human nature?
- l. A country that has a powerful president and a prime minister may be called a duarchy. Why?
- m. Why are cats, dogs, horses, and pigs called quadrupeds?

- n. Quinquennial plans are frequently used in Soviet Union, India and elsewhere. What is the main reason for such plans?
- o. What might a quinate design look like?

LESSON 5

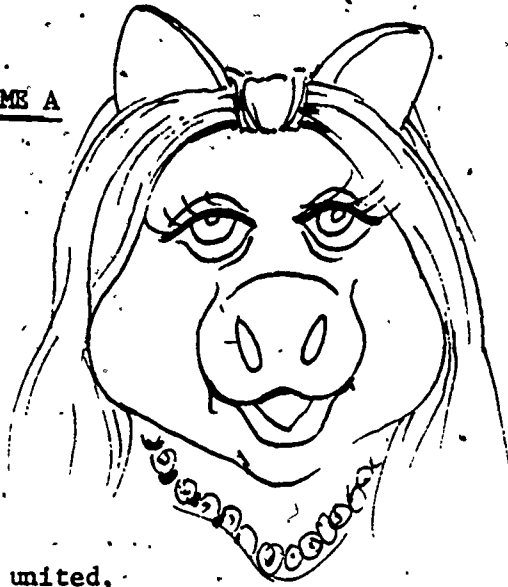
Objectives

1. To review the reading and writing of derivatives and cognates presented thus far in this Unit
2. To introduce pupils to some or all of the following English derivatives and cognates from the Latin numbers unus through quinque: unit, disunity, communist, unicycle, uniparous, universal, university, duologue, duopod, duotone, trident, trifocal, trichord, quadrilateral, quadrilateral, quadruple, quintuple, quinquepartite, quintessence

Activities

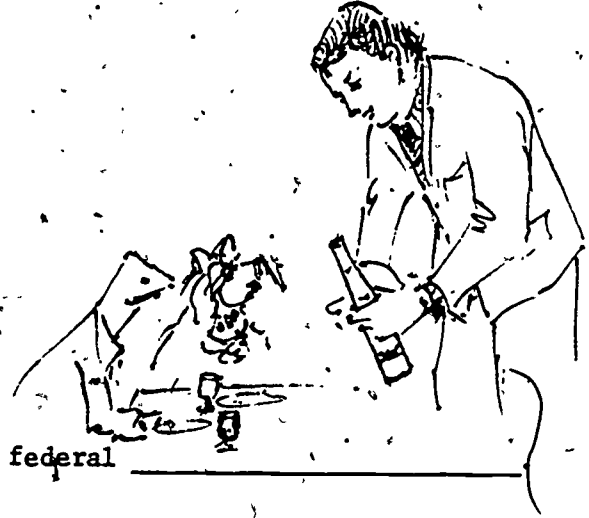
1. Have pupils echo orally all of the following English derivatives and cognates presented in Lessons 1 and 2 of this Unit. Have the derivatives and cognates used in sentences.
2. Distribute the following word game to the pupils and have them work on it during the class period. Help individual students as necessary.

WORDGAME A



Miss Piggy, internationally known celebrity and sex symbol from the Muppets, gets a free meal at a fashionable restaurant every time you fill in a blank in the sentences below correctly. Use the words which are all related to the Latin roots unus, duo, tres, quattuor and quinque - that she supplies. Help Miss Piggy get a lot of free meals!

union, united,
unicorn, unisex, unique,
uniform, unison, univocal,
unicellular, unilateral,
duality, duarchy, duodecagon,
duplicity, trefoil, triceps,
trilateral, triume, quadriplegic,
quadruped, quadrangle, quadrant,
quintet, quinquennial, quinate



1. The states of the United States form a federal _____
2. A group that sings together sings in _____
3. If the United States disarmed while the Soviet Union did not such disarmament would be _____
4. A one-celled animal such as an amoeba is described by biologists as _____
5. A statement that has only one possible meaning may be described as _____
6. Hairstyles for girls and guys are often similar and are called _____
7. The three-leafed symbol of Fidelity Bank is the _____
8. A war veteran who has lost the use of his arms and legs is called a _____
9. The Jackson Five is a _____
10. The mythological creature with one big horn on its head is the _____

11. A community that works together is said to be _____.
12. Miss Piggy has a _____ personality, i.e., she is one of a kind.
13. People have an emotional side and a rational side; there is said to be a _____ in their personality.
14. The Roman Republic insofar as its executive branch was headed by two consuls is called a _____.
15. A geometric figure with twelve sides is called a _____.
16. Richard Nixon when he was President was accused of much lying and _____.
17. A three-headed arm muscle is called a _____.
18. When India, Bangladesh, and Ceylon cooperate, the cooperation may be described as _____.
19. Inasmuch as most Christians believe that there are three persons (Father, Son, and Holy Spirit) in one God, God is sometimes described in hymns and prayers as _____.
20. Cats and dogs walk on four paws and are said to be _____.
21. Rittenhouse Square is shaped like a _____.
22. At 3:00 P.M. the small area between the big hand and the small hand on the clock is called a _____.
23. General elections in some countries are held every five years and are therefore _____.
24. The facade of a building with five pillars may be called _____.
25. Occupations such as nurse, transit worker, policemen and waiter usually require a _____.

3. Point out to pupils that through Latin roots they can figure out the meanings of additional English words in the case of an English word already known and that knowledge of the Latin root can often enhance one's appreciation and understanding of the word. Have the pupils echo the English derivatives and cognates in the following chart. Then invite discussion of the meaning of each word and have each word used in a sentence. Pupils might be assigned to check on the meaning of each derivative or cognate in a dictionary, and to write a sentence using each derivative or cognate.

ENGLISH DERIVATIVE OR COGNATE	LATIN ROOT	MEANING OF ENGLISH DERIVATIVE OR COGNATE
unit	unus "one"	an individual group, structure, or entity
disunity	unus "one"	lack of oneness
communist	unus "one"	person believing in one common ownership of means of production
unicycle	unus "one"	one-wheeled vehicle
uniparous	unus "one"	producing only one offspring at a time or having produced only one offspring
universal	unus "one"	of, pertaining to or affecting everything
university	unus "one"	one educational institution where doctorates and master's degrees as well as bachelor's degrees are awarded
duologue	duo "two"	a literary composition for two speakers
duopod	duo "two"	a two-footed animal
duotone	duo "two"	a process for printing in two tones of the same color or in two colors
trident	tres "three"	a three-pronged fork

trifocal	tres "three"	a lens having three parts: one for near vision, one for far vision & one for intermediate
trichord	tres "three"	a three-stringed instrument
quadrilateral	quattuor "four"	having four sides
quadruple	quattuor "four"	times by four, fourfold
quintuple	quinque "five"	times by five, fivefold
quinquepartite	quinque "five"	consisted of or divided into five parts
quintessence	quinque "five"	the pure, highly concentrated essence of something (in medieval philosophy the fifth element after earth, air, fire, and water)
quadrilateral	quattuor "four"	having four letters

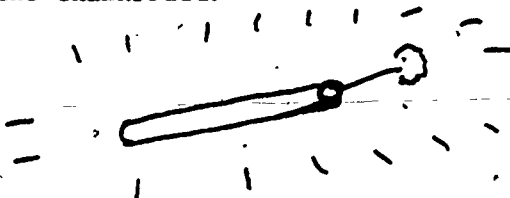
LESSON 6

Objectives

To review derivatives and cognates from UNUS

Activities

1. Point out that UNUS is one of the most productive Latin words in terms of derivatives and cognates. It's like a stick of fireworks on the 4th of July. It explodes into a wide variety of words. While talking draw the following on the chalkboard:



Have pupils echo the following derivatives and cognates: unification, unilateral, unicellular, communist, unit, disunity, unison, unisex, unique, uniform, unicycle, unicorn, union, united, uniparous, univocal, community, unity, universal, university, unanimous, unanimity

Ask pupils the meanings of a few of these. (Some of the derivatives and cognates may be unfamiliar, e.g., uniparous "having one child").

2. Distribute the following wordgame. Have pupils work on it in class and/or at home.

WORDGAME B

Find the derivatives and cognates from the check list in the following grid. Circle them. All derivatives and cognates are connected with the Latin root UNUS.

Good Luck!

CHECK LIST

E	U	Q	I	N	U	S	S	K	U	S	T	Y	I	A	N	E	Z	Y	E
U	N	R	P	S	T	T	P	I	N	U	T	A	L	U	A	P	T	R	U
H	I	<u>U</u>	<u>N</u>	<u>U</u>	<u>S</u>	O	Q	M	I	I	N	I	U	N	I	L	T	E	C
I	V	N	M	A	I	W	R	U	N	I	S	O	N	U	N	N	E	B	L
Z	E	U	S	R	N	A	O	U	A	N	B	R	I	U	T	R	E	E	A
Y	R	L	B	I	U	N	B	P	O	X	A	Q	S	C	L	O	R	L	S
T	S	A	E	A	M	D	I	I	F	L	O	I	E	C	L	I	L	T	S
I	I	R	Z	T	M	A	T	Q	U	Q	D	N	X	A	N	E	D	U	L
N	T	E	M	I	O	A	Q	L	S	N	D	U	S	R	H	C	O	M	A
U	Y	T	R	N	C	Q	L	I	A	I	I	R	O	S	U	R	R	O	C
M	G	A	O	I	E	E	G	O	L	D	E	C	D	F	A	Y	I	S	O
M	W	L	E	L	C	R	O	X	A	V	I	P	Y	P	V	L	S	I	V
O	E	I	I	I	B	O	O	I	N	F	R	I	C	W	A	T	R	I	
O	N	N	N	S	N	O	I	N	U	X	N	N	S	T	L	C	R	O	N
U	D	U	U	A	U	R	U	L	Y	N	U	U	N	I	T	E	D	D	U

1. unification
2. unilateral
3. unicellular
4. units
5. communist
6. disunity
7. unison
8. unisex
9. unique
10. uniform
11. unicycle
12. unicorn
13. union
14. united
15. uniparous
16. univocal
17. community
18. unity
19. universal
20. university
21. unanimity

Now fit the derivatives and cognates into the following sentences:

1. At the circus some of the clowns were riding a funny one-wheeled vehicle called a _____.
2. The _____ of Pennsylvania has a very large student enrollment.
3. The Mayor told all the Democratic ward leaders at the fund-raising dinner that in _____ there is strength.
4. The _____ is a mythological creature that resembles a horse with a single horn on its head.
5. The _____ of East and West Germany is a political impossibility according to the Soviet government.
6. The Chinese _____ want the U.S. to withdraw its troops from Taiwan.
7. U.S.S.R. stands for the _____ of Soviet Socialist Republics.

8. A woman who has given birth to one child may be called _____.
9. The waitress recognized their _____ at once and told her boss that several soldiers of the French Foreign Legion had come into the bar.
10. The television commercial urged everyone to fly the friendly skies of _____ Airlines.
11. Clothes that can be worn by either a boy or a girl are called _____ fashions.
12. Arguments lead to _____ among the generals, and the battle was eventually lost.
13. An agreement or treaty which is one-sided is called _____.
14. Towanda's hairdo was so _____ that everyone admired its originality.
15. When Mr. Gregory said, "Sit down!" his tone of voice was _____.
16. A _____ characteristic of all birds is that they have feathers.
17. Gang warfare is a serious _____ problem.
18. A watt is a _____ of electrical power.
19. _____ are so small that they are usually _____.
20. Mrs. Carmen's choir always sings in harmony and _____.

LESSON 7

Objectives

1. To introduce the following derivatives and cognates from: sex, septem, octo, novem, decem; sextant, sexisyllable, sextet, septuplet, septennial, septuagenarian, octagon, octave, octahedron, novena, novenary, November, decimate, decimeter, decimalize
2. To provide background on the history of the calendar and some aspects of Roman rule.

Activities

1. Put the following Roman numerals on the chalkboard:

VI VII VIII IX X

Have pupils count using the direction

Numerate mecum: sex, septem, octo, novem, decem

2. Approach the following chart in the usual way:

ENGLISH DERIVATIVE OR COGNATE	LATIN ROOT	MEANING OF ENGLISH
sextant	sex "six"	a navigational instrument where an arc of a circle is divided into six equal parts
sextuplet	sex "six"	six babies born at one time to one mother
sextet	sex "six"	a group composed of six musicians or vocalist
septuplet	septem "seven"	one of seven offspring at one birth
septennial	septem "seven"	every seven years
septuagenarian	septem "seven"	a person 70 years old or between 70 and 80
octagon	octo "eight"	eight sided figure
octave	octo "eight"	an interval of eight tones in music
octahedron	octo "eight"	a solid with eight plane surfaces
novena	novem "nine"	nine days of prayer or devotion
novenary	novem "nine"	in nines
November	novem "nine"	name of a month that was formerly the ninth month in the Roman calendar.
decimate	decem "ten"	to destroy or kill a large part: to kill one in every ten people
decimeter	decem "ten"	one tenth of a meter
decimalize	decem "ten"	to change to a decimal system

3. Explain that originally in the Roman calendar Martius (March) was the first month of the year and hence September was the seventh month, October, the eighth, November, the ninth, and December, the tenth. Originally it seems that there were only ten months in the Roman calendar with an uncounted gap in the winter between years. While Rome was still ruled by Kings, Januarius (named for Janus, the god of beginnings) and Februarius (connected with the festival of purification called Februa) were added as "new" months. The old names for September, October, November and December were retained despite the facts that they were no longer the 7th, 8th, 9th and 10th months respectively.

4. Explain that as the Roman Empire grew the Romans prided themselves on bringing peace and civilization to the whole world. The modern image of Rome "conquering" the world, i.e., imposing its rule through force of arms, is not wholly accurate. Sometimes rulers willed their kingdoms to the Romans because they appreciated the benefits of Roman rule. There are instances of people rising up in war against the Romans in order to be permitted the privilege of becoming part of the Empire. Many tribes and areas freely associated themselves with the Empire. The Roman legions stationed in different parts of the world helped maintain the Pax Romana ("the Roman Peace").

The strict discipline in the legions was one of the reasons for their effectiveness. Cowardice, loss of the standards in action, or mutiny were punished by a process called decimatio, the selection by lot of every tenth man for capital punishment. Sometimes decimatio was used to put down rebellions as in the slave revolt led by Spartacus. By extension over the centuries decimatio came to refer to wide scale destruction rather than to capital punishment for every 10th person.

5. Pupils might be asked to write sentences using derivative and cognate introduced in this lesson in a sentence. The writing of such sentences might be made a homework assignment.

LESSON 8

Objectives

1. To review the English derivatives and cognates presented in the preceding lesson.
2. To introduce or review Latin terms used in arithmetic problems, viz., et, sunt, minus, multiplicatum per, divisum per

Activities

1. Begin the lesson entirely in Latin using the following problems. Have the pupils supply the answers given here in brackets. The appropriate Roman numerals may be written on the chalk board.

Numerate mecum! Unus, duo, tres, quattuor, quinque, sex, septem
octo, novem, decem

Unus et unus sunt duo

$$1 + I = II$$

Duo et duo sunt quattuor

$$II + II = IV$$

Tres et duo sunt sex

$$III + III = VI$$

Quattuor et quattuor sunt octo

$$IV + IV = VIII$$

Quinque et quinque sunt decem

$$V + V = X$$

Decem minus duo sunt octo

$$X - II = VIII$$

Novem minus tres sunt sex

$$IX - III = VI$$

Sex minus quinque sunt unus

$$VI - V = I$$

Octo minus quattuor sunt quattuor

$$VIII - IV = IV$$

Quinque minus tres sunt duo

$$V - III = II$$

Tres multiplicatum per tres sunt novem

$$III \times III = IX$$

Duo multiplicatum per duo sunt quattuor

$$II \times II = IV$$

Duo multiplicatum per quinque sunt decem

$$II \times V = X$$

Quattuor divisum per duo sunt duo

$$IV \div II = II$$

Decem divisum per quinque sunt duo

$$X \div V = II$$

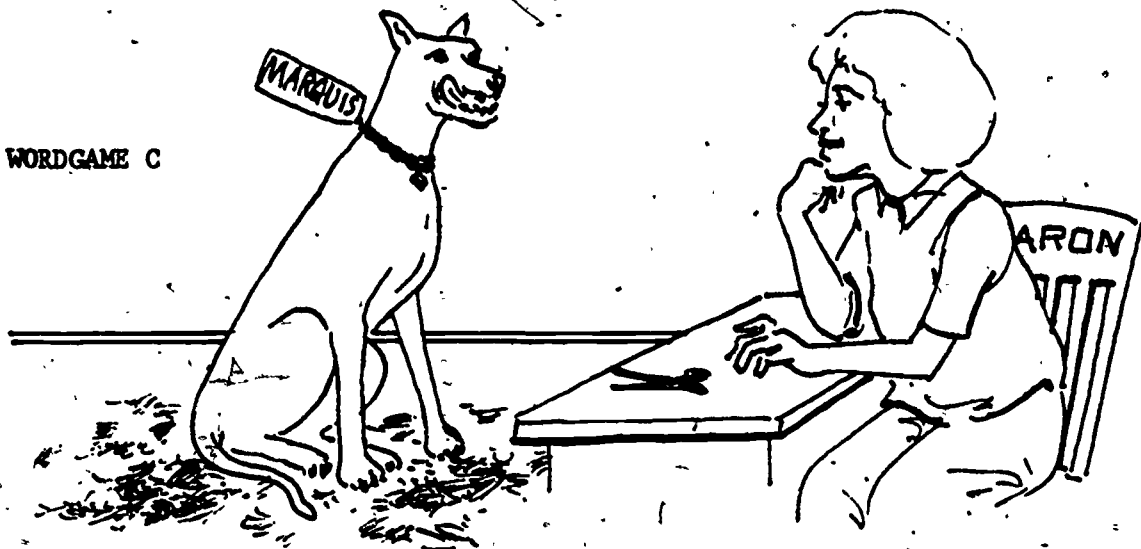
Novem divisum per tres sunt tres

$$IX \div III = III$$

Similar problems may be constructed.

2. Distribute the following wordgame after having the pupils echo chorally all the derivatives and cognates from the preceding lesson.

WORDGAME C



Marquis is a ferocious collie-shepherd who has just had his fur clipped by his friend, Sharon, and is therefore very annoyed. Sharon is attempting to placate him by offering him milkbone dog biscuits. She finds, however, that each milkbone somehow has a derivative or cognate on it. Help Sharon and Marquis by removing the derivatives or cognates from the milkbone and placing them in the proper sentences below. Latin roots are given in parentheses to help you. Good luck to you and Marquis and Sharon!

- | | | | |
|-----------|----------------|------------|------------|
| sextant | septennial | octave | novenary |
| septuplet | decimate | octahedron | decimalize |
| sextet | septuagenarian | November | |
| decimeter | octagon | novena | |

1. A captain of a boat is likely to use a _____ (sex).
2. When Australia converted its currency to dollars and cents from the pounds sterling system it was said to _____ its currency (decem).
3. A woman or man who is 75 years old could be called a _____ (septem).
4. A system of numbers based on nines could be described as _____ (novem).
5. One tenth of a meter is a _____ (decem).
6. An eight sided plane is an _____ (octo).
7. A solid with eight sides is called an _____ (octo).
8. Nine days of prayer in some Christian churches is called a _____ (novem).
9. The month of the year that used to be the nine month is _____ (novem).
10. A fair or celebration held every seven years could be called _____ (septem).
11. "Do, re, mi, fa, sol, la, ti, do" constitutes an _____ in music (octo).
12. A human _____, i.e., one of seven children born at the same time from the same mother, is extremely rare (septem).
13. People accused the United States of trying to _____ Vietnam during the War in Vietnam. (decem)

LESSON 9

Objectives

1. To introduce the following Latin utterances:

Decem multiplicatum per decem sunt centum	X X = C
Centum multiplicatum per decem sunt mille	C X = M
Quoties sunt centum divisum per decem? Decem	How much is a hundred, divided by 10? 10
Quoties sunt mille divisum per decem? Centum	How much is a thousand divided by 10? 100
Da summam	Give the sum
Addel Subtrahel Minue! Multiplica! Divide!	Add Subtract Subtract Multiply Divide

2. To introduce the following English derivatives and cognates: decimeter, centimeter, millimeter, milliliter, milligram, addend, sum, minuend, subtrahend, multiplier, multiplicand, quotient, dividend, divisor.

Activities

1. Begin the class entirely in Latin with the problem Decem multiplicatum per decem sunt. Supply the answer centum and have the pupils echo, several times. Put the problem on the chalkboard in the form of Roman numerals but not in words. Follow a similar procedure to teach Centum multiplicatum per decem sunt mille.
2. Ask the question Quoties sunt centum divisum per decem? Supply the answer decem and put the problem on the chalkboard in Roman numerals thus: $C \div X = X$. Follow a similar procedure for teaching Quoties sunt mille divisum per decem?
3. Put the following problem on the chalkboard: $IV + II =$. Use the commands Da summam! and Addel! to indicate that addition is required. Elicit the answer (sex). You may have to explain that Da summam! and Addel! are synonymous expressions. Change the plus sign to a minus sign and use the commands Subtrahel! and Minue! to indicate subtraction. Again it may be necessary to explain that Subtrahel! and Minue! are synonyms. Elicit the answer (duo). Change the minus sign to a multiplication sign thus: $IV \times II =$. Use the command Multiplica! to indicate that multiplication is required. Elicit the answer (octo). Change the multiplication sign to a division sign thus $IV \div II =$. Use the command Divide! to indicate that division is required. Elicit the answer (duo). A similar procedure may be followed using the following problems and with other that might be invented.

VI + III =	<u>Adde!</u>
VI - III =	<u>Minue!</u> <u>Subtrahere!</u>
VI x I =	<u>Multiplica!</u>
VI ÷ III =	<u>Divide!</u>

4. Explain to the pupils that the Latin words decem, centum, and mille provide keys to understanding metrics. The Latin words are used as prefixes to indicate a fraction of a basic metrical unit, thus:

meter	
decimeter	1/10 of a meter
centimeter	1/100 of a meter
millimeter	1/1000 of a meter
liter	
milliliter	1/1000 of a liter
gram	
milligram	1/1000 of a gram

You might point out that when decem, centum and mille are used as prefixes the endings are dropped and a connecting vowel (-i-) inserted. You might also point out that Greek words δέκα (déca "ten"), ἑκατόν (hecatón "hundred") and χίλιοι (kilioi "thousand") also give us prefixes that are used to indicate multiplication. The prefixes are deca-, hecto-, and kilo-. Thus the following terms:

meter	
decameter	- 10 times a meter
hectometer	- 100 times a meter
kilometer	- 1000 times a meter
liter	
kiloliter	- 1000 times a liter
gram	
kilogram	- 1000 times a liter

You may also wish to tell the pupils that the basic terms meter, liter & gram are also from Greek through Latin. Meter comes from metron μέτρον the Greek for "measure". Liter comes from litra λίτρα, the name of an old Greek unit of weight. Gram is from gramma γράμμα ("letter")

5. Explain that the names of various parts of arithmetic problems are taken from Latin. Assure the pupils that you are throwing in the mathematical terminology at no extra charge! Put the following problems on the board and point out the terminology orally. Have pupils echo and then copy the examples into their notebooks. Point out that the ending -nd on a word indicated "that which must be _____". The letter -r indicates "that which _____s" (i.e., agent).

$$\begin{array}{r} 4 \\ + 2 \\ \hline 6 \end{array}$$
 addend ("that which must be added")
 addend ("that which must be added")
 sum

$$\begin{array}{r} 4 \\ - 2 \\ \hline 2 \end{array}$$
 minuend ("that which must be lessened")
 subtrahend ("that which must be subtracted")
 remainder

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 8 \end{array}$$
 multiplicand ("that which must be multiplied")
 multiplier ("that which multiplies")
 result

$$\begin{array}{r} 2 \\ 2 \overline{) 4} \end{array}$$
 quotient ("how many times")
 dividend ("that which must be divided")

divisor ("that which divides")

LESSON 10

Objectives

To review the English derivatives and cognates presented in the previous lesson

Activities

1. Have pupils echo each derivative and cognate. Then ask the pupils to explain each derivative and cognate in terms of its etymology.
2. Distribute copies of the following wordgame. Assist pupils individually as necessary.

WORDGAME D

This wordgame represents a contest between Julius Caesar, the Roman leader, and Vercingetorix, the Gallic chieftain, for the loyalty of the people of Gaul (ancient France). For every even numbered question answered correctly Caesar gets 100 followers. For every odd numbered question answered correctly Vercingetorix gets 100 followers. Tabulate the number of followers obtained under each picture. Latin roots are scattered about to help you.



1. One tenth of a meter is called a _____. (DECEM)
2. One hundredth of a meter is called a _____. (CENTUM)
3. One thousandth of a meter is called a _____. (MILLE)
4. In the metric system Latin prefixes indicate a fraction of a basic metrical unit. Whereas, Greek prefixes indicate multiples of the basic unit deci-, centi-, and milli- are examples of _____ prefixes.
5. One thousandth of a liter is called a _____. (MILLE)
6. One thousandth of a gram is called a _____. (MILLE)
7. Deca-, hecto- and kilo- are _____ prefixes that indicate multiples of the basic unit thus a kilometer is 1000 times a meter and a _____ is 1000 times a gram.

8. In the following addition problem label the parts: (ADDE)

$$\begin{array}{r} 8 \\ + 2 \\ \hline 10 \end{array} \quad \begin{array}{l} \text{_____} \\ \text{sum} \end{array}$$

9. In the following subtraction problem label the parts: (MINUE, SUBTRAHE)

$$\begin{array}{r} 8 \\ - 2 \\ \hline 6 \end{array} \quad \begin{array}{l} \text{_____} \\ \text{remainder} \end{array}$$

10. In the following multiplication problem label the parts (MULTIPLICA).

$$\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array} \quad \begin{array}{l} \text{_____} \\ \text{result} \end{array}$$

11. Label the parts. (DIVIDE)

$$\begin{array}{r} \text{_____} \\ 3 \text{ quotient} \\ \hline)6 \end{array}$$

12. Numbers that must be added together are called _____. (ADDE)
13. A number that must be divided is called a _____. (DIVIDE)
14. A number that must be multiplied is called a _____. (MULTIPLICA)
15. A number that must be subtracted is called a _____. (SUBTRAHE)
16. A number that must be made less or diminished is called a _____ (MINUE)
17. How many centimeters in a meter? _____ (CENTUM)
18. How many millimeters in a meter? _____ (MILLE)
19. How many decimeters in a meter? _____ (DECEM)
20. How many milliliters in a liter? 35 _____ (MILLE)

APPENDIX - HOW THE ANCIENTS COUNTED



Calculator

1 2 3 4 5 6 7 8 9 0 — throughout the world people recognize and use these ten symbols every day. For many years language experts have been trying to develop one universal language which will be understood by everyone. Although this may be impossible, something similar has been done in math. For approximately 1,000 years the ten symbols we use for counting have been accepted by most nations as the standard figures to use for all mathematical problems.

No one knows for sure exactly when these figures were first used. For centuries traders and merchants who travelled from country to country selling their products used various numerical symbols. Gradually, to help themselves and their customers understand and compare prices, these traders began using similar symbols. In India, over a thousand years ago, the symbols first used to represent 1-9 were used.

Historians have found Indian records using these numbers to compute the position of the stars. In time, these records were translated into Arabic. Thus, although our numbers originated in India, we call them Arabic numbers. The first European record of these numbers is a Spanish text written in A.D. 976.

1 2 3 4 5 6 7 8 9

But how did the ancient Greeks and Romans count?

The earliest method of recording numbers was not to write something, but rather to cut a notch (mark) on some object, e.g. a piece of wood. However, as business and trade increased, this notch system became impractical.

In Greece, one of the number systems mathematicians developed used the initial letter of the name of the number to represent the number.

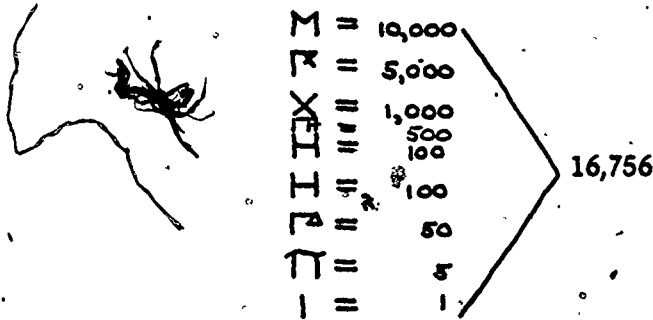
EX: 5 = ϵ for Πέντε (five)
 10 = Δ for Δέκα (ten)
 100 = Η for Ηεκατόν (one hundred)
 1,000 = Χ for Χίλια (one thousand)
 10,000 = Μ for Μύρια (ten thousand)

For larger numbers the Greeks combined the above symbols with the symbol for 5.

EX: 50 = $\epsilon\delta$ (5x10)
 500 = $\epsilon\eta$ (5x100)
 5,000 = $\epsilon\chi$ (5x1000)
 50,000 = $\epsilon\mu$ (5x10,000)

Therefore, our number 16,756 in ancient Greece would have been:

ΜΙΧΧΕΗΗΓΑΤΤΙ



The ancients also developed an elaborate system of counting using their fingers — they bent them, held them straight or closed them. Because of the number of fingers we have, ten became the base number as it still is today. In fact, our numbers 1-9 are called "digits" from the Latin word for fingers digiti.

The ancients used the thumb and forefinger of their left hand to represent 10-90 and the other fingers to represent 1-9. They used the thumb and forefinger of their right hand to represent 1,000-9,000 and the other three fingers for 100-900. They used the same positioning of the fingers to represent the other numbers — the thumbs and forefingers of each hand telling you whether 10's, 100's or 1,000's were meant.

In addition to this finger system, the Romans had developed numerical symbols. Many historians believe these symbols represented the position of the fingers in counting.

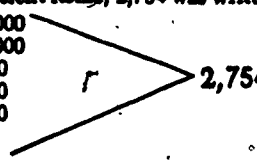
- | | |
|--|---------------------|
| 1 = I
(one finger raised) | 6 = VI |
| 2 = II | 7 = VII |
| 3 = III | 8 = VIII |
| 4 = IIII | 9 = VIIII |
| 5 = V
(opening between thumb and fingers) | 10 = X
(two V's) |

The other Roman symbols were:

- 50 = L (from an old Greek form)
- 100 = C (from Latin word for 100, centum)
- 500 = D (half of I, symbol for 1,000)
- M (from Latin word for 1,000, mille)
- 1,000 = \overline{M} or \overline{C}
- 10,000 = \overline{X}
- 100,000 = \overline{C}
- 1,000,000 = \overline{M}

The later Romans slightly altered this system by eliminating the use of the IIII. Instead of writing XXVIII (28), they wrote the next highest number, in this case XXX (30), and placed a I before the last digit to indicate that one must be subtracted from it. Thus 29 became XXIX.

Accordingly, in ancient Rome, 2,754 was written: MMDCCLIV

M	=	1,000	
M	=	1,000	
D	=	500	
C	=	100	
C	=	100	
L	=	50	
IV	=	4	

For almost 2,000 years these Roman numerals were used in all parts of the ancient world. Even today in the twentieth century we use these Roman numerals constantly, e.g. on clock and watch faces, on cornerstones of buildings, for numbering chapters of a book, for numbering volumes of books.

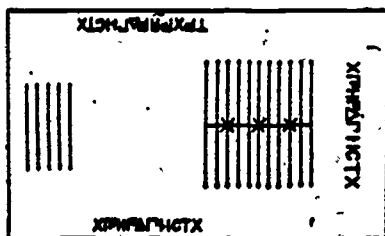
THE ABACUS

Because the ancients used letters to represent their numbers, it was awkward to do complicated problems involving addition, subtraction, multiplication and division.

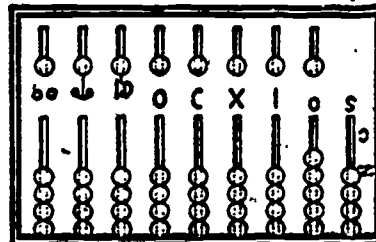
Therefore, the ancient Greeks and Romans used a counting board called an abacus. The word abacus was originally a near-Eastern term meaning "sand strewn on a surface for writing". The abacus usually took the form of a board marked with grooves or lines along which pebbles were moved into different positions to represent the various numbers. Thus, these pebbles, called *calculi* in Latin, were the means by which the ancients "calculated".

Many ancient mathematicians were extremely skilled with the abacus and could solve very involved mathematical problems quickly. Even today in China, Japan and other Eastern countries, the abacus is widely used. In fact, some "abacus-experts" have solved various math problems more quickly with the abacus than skilled mathematicians using paper and pencil or adding machines. Computers, however, have now made it impossible for the "abacus-experts" to compete.

Below are diagrams of a Greek abacus (the pebbles would be placed in the grooves between the lines) and a Roman abacus (the pebbles would be placed in the grooves represented by the lines). The five lines on the left side of the Greek abacus provide four grooves for pebbles representing fractions. In the Roman abacus, the single groove at the right and the groove next to it and above were for pebbles representing fractions.



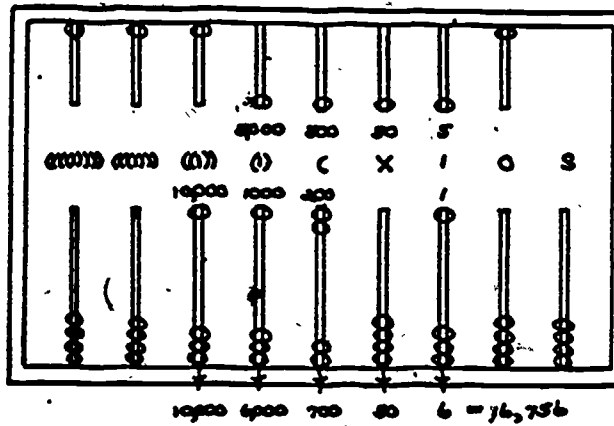
Greek Abacus



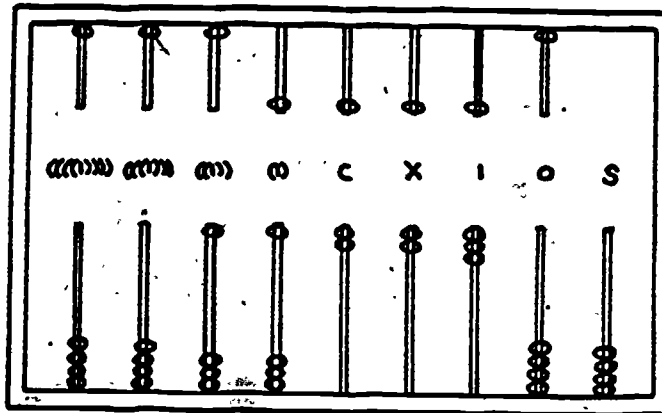
Roman Abacus

Each of the other grooves represented the units column, the tens, hundreds and so on. The pebbles on the lower grooves represented 1-4, 10-40, 100-400 etc. The pebbles on the upper grooves represented 5, 50, 500 etc.

To represent the number 16,756, the Romans would move their pebbles or pieces of glass or stone to the positions as seen below. The calculi moved to the center are the ones to be counted. Next to these are their value in relation to the number 16,756.



To add, you increased the number of calculi. To subtract, you decreased them. Multiplication was just constant addition and division repeated subtraction. Therefore, if you added 22 to 16,756, the abacus would show:



Until only 300 years ago, in the late 1600's, the abacus, using the Roman system of calculating, was still used throughout Europe.

(Reprinted from
Classical Calliope
 April, 1981 cum permissu.)

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