



IT'S ALL GREEK (AND LATIN) TO ME!

SUBJECTS: English/Language Arts, Science, Health, Foreign Languages

GRADES: 6-8

DURATION: One class period

GROUP SIZE: One classroom of 25-30 students

SETTING: Indoors

KEY VOCABULARY: Greek, Latin, prefix, suffix, root word, etymology

ANTICIPATORY SET: When learning new words are you ever curious about what they mean and where they originated? Today we will learn how to decode the meaning of words without looking in a dictionary.

OBJECTIVES: Students will be able to use Latin root words, suffixes and prefixes in order to: 1) match word parts with their meanings; 2) combine word parts to create scientific terms; 3) create new words by using learned root words, suffixes, and prefixes; and 4) use scientific and newly invented words in creative writing situations.

MATERIALS: One set of Memory Cards for each group of 2-4 students, one Key to Roots, Prefixes and Suffixes for each group, paper, pencil.

BACKGROUND: Many Mammoth Cave organisms are described using scientific terms. These terms are usually derived from Greek or Latin root words, prefixes, or suffixes. Latin and Greek words are used predominantly in science and medicine because the words and their meanings do not change. If you are familiar with the meanings of these root words, you can easily decode new and old scientific terms.

At different times, Greece and Rome were world powers with the Romans eventually conquering the Greeks. Roman rule spread, extending far outside Italy -- into Asia to the East and westward to the British Isles. Conquered peoples had to become familiar with the language of their rulers. As a result, Greek and Latin were at different times considered universal languages.

As languages are used, they constantly change and evolve. The Romans "borrowed" many Greek words. Roman words were absorbed into other local languages. Like Greece, Rome eventually lost its position as a world power and the Roman language, Latin, was no longer spoken. This meant that Latin, as a language, stopped evolving or changing. Today, many English words are derived, or borrowed, from original Greek and Latin vocabularies.

In the mid-1800's scientists began using a two-word descriptor to name new species of plants and animals. By this time, Latin was no longer in daily usage. Because the meanings of its words were no longer changing, scientists decided to use early Greek and Latin prefixes, root words, and suffixes to provide these new descriptive (scientific) names. Today, scientists can understand a great deal about a species by simply translating its name! By agreeing to use this system of a common scientific language, scientists from around the world can now share their knowledge and discoveries without the need to translate from or into many individual languages.



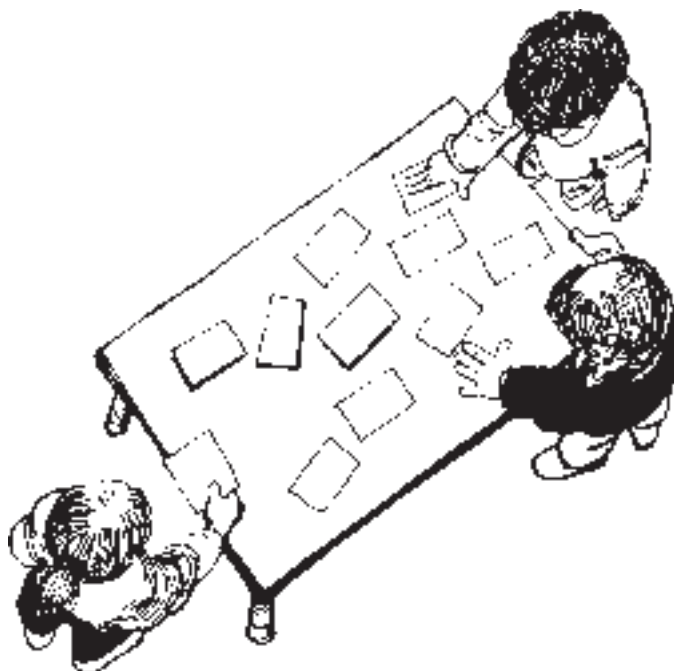
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PROCEDURE:

1. The teacher explains the difference between a root word, a prefix and a suffix. The teacher further explains that these word parts can be combined to form scientific words that are regularly used at Mammoth Cave National Park and by scientists in other locations around the world. For example, "herba" is a root word meaning "grass" (or plants). A prefix or suffix can be added to "herba" in order to change the meaning. For example the suffix "cida" means "killer". Combining herba and cida gives you the new word "herbicide", or plant killer. The suffix "vorus" means "eating". Combining herba and vorus gives you the new word "herbivore", or plant eater. You can see this root (herba) used in other words such as herbs, herbarium, or herbaceous. Point out that while the connecting vowel is often changed to make the word easier to pronounce, it is still fairly easy to see the various root words being used!
2. Divide the class into small groups of 2-4 students each. Give each group a set of Memory Cards and one copy of Key to Roots, Prefixes, and Suffixes.
3. The teacher tells the students that they will be using Greek and Latin words to play a basic "Memory" game in which they memorize the location of matching cards.
4. The teacher instructs each group to shuffle their cards and lay them face down on a flat surface (table or floor). Students take turns turning the cards over to match a word with its correct definition. If the definition is not found, they turn the cards back facedown. The next student uses his/her memory to locate the correct cards. Students pick up and keep any matching cards they find. Play continues until there are no cards left on the table. The winner is the student with the most matching cards. Students may use the Key to Roots, Prefixes, and Suffixes to check their choices.
5. The teacher tells the students they will now be using the Greek and Latin words from their memory game to form scientific terms that could be used by scientists at Mammoth Cave National Park. Each group should record all the words they were able to make by combining their Latin/Greek prefixes, root words and suffixes in various ways, grouping all real terms together and all newly created terms together. Students should provide the meaning of each word created.

CLOSURE: Etymology is the study of the history and origin of words. Today you have learned to break apart a word in order to understand its meaning. You learned to use prefixes, root words, and suffixes to create new words that describe new ideas, species, objects or discoveries.

EVALUATION: The teacher is able to evaluate the students through their group participation and their list of scientific words and definitions.



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EXTENSIONS:

1. Have students collect scientific terms and names found in their school literature -- from their science books, literature books, or library readings. Each student could keep a journal or notebook of new terms they find.
2. Using the Key to Roots, Prefixes, and Suffixes, instruct students to create a list of as many descriptive words as they can by combining prefixes, suffixes and root words found in the list. Have each student write a story about a cave creature using as many of the real terms and new terms as possible from their list. "Real" terms (such as subterranean or microscopic) should be underlined. "New" terms (such as transterranean or terreaneanphile) should be circled.
3. Can students identify the various Greek/Latin stems found within words? Have students use a dictionary to look up the identifying root, prefix, or suffix within the following list of words. The first two have been done for you. Add new words to this list.

Can you find the origins of: school, bisect, insect, botanical, zoologist, cave, mammal, geology, gypsum, river, student, or science? (choose any 8)

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4. Give each student a copy of the Key to Roots, Prefixes, and Suffixes. The teacher writes one of the word segments on the board. Students are given three minutes to form as many words as possible using the indicated word segment. For example, if the teacher writes the prefix "un-", students attach root words and suffixes to "un-" to form new words. If the teacher writes the root word "locate", students can use prefixes and suffixes to form words such as "echolocation" and "relocated". Students may use the word segments found in the Key to Roots, Prefixes, and Suffixes or they may use others. When time is up, students take turns reading their list of words. As a word is read, any students with the same word should cross out or place a checkmark next to that word to show it is a duplicate. Students score one point for each unique word left on their list. In case of doubt, the unique words 1) must be found in the dictionary or 2) if the teacher is willing to accept creativity, the author must be able to offer a logical definition. The winner gets to choose and write the next word segment on the board. How many unique words were created by class members?
5. Have students print root words, prefixes, and suffixes on 3"x5" index cards, one word or word segment per card. Put the root words on one pile and punch a hole through the top of the cards. Secure the cards with a book ring. Follow the same procedure for the prefixes and for the suffixes. Lay the card piles in order (prefix-root word-suffix). Students work individually to form as many words as they can by flipping prefixes, root words and/or suffixes. The student records the words they have formed. After each student has had time to record their lists, they exchange lists and check the words in a dictionary to be certain the words are correct.



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KEY TO GREEK AND LATIN – ROOTS, PREFIXES AND SUFFIXES

BASE WORD	WORD ORIGIN	ORIGINAL MEANING OF THE BASE WORD
-al	from Latin <i>-alis</i>	of, relating to, characterized by, process
anthrop-	from Latin <i>anthropo-</i>	human being
aqua	from Latin <i>aqua</i>	water
arte	from Latin <i>arte</i>	by skill (human)
arthr- (or arthro-)	from Greek <i>arthron</i>	joint
aut- (or auto-)	from Greek <i>autos</i>	same, -self, self
bi-	from Latin <i>bi-</i>	two
bi- (or bio-)	from Greek <i>bios</i>	mode of life, life
carn-	from Latin <i>carn-</i>	flesh
centi-	from Latin <i>centi-</i> (or <i>centum</i>)	hundred, hundredth part
-cidal	from Latin <i>-cidalis</i> (or <i>-cida</i>)	killing, having the power to kill
-cide	from Latin <i>-cida</i> (or <i>caedere</i>)	to cut, to kill
de-	from Latin <i>de-</i> (or <i>dis-</i>)	to remove, away, from
deca- (dec-, deka- or dek)	from Latin <i>deka-</i>	ten
-dyte	from Greek <i>-dantai</i> (or <i>dyein</i>)	enter, to enter
echo-	from Greek <i>eche-</i> (or <i>echo-</i>)	sound
-er	from Latin <i>-arius</i>	added to verbs to form a noun (ie, baker from bake)
-fact	from Latin <i>factum</i> (or <i>factus</i>)	to do (made)
fauna	from Latin <i>Fauna</i> , sister of <i>Faunus</i> , the Roman god of animals	animal life
flora	from Latin <i>flor-</i> (or <i>flos</i>) meaning flowers; and <i>Flora</i> , the Roman goddess of flowers	plant life
herb	from Latin <i>herba</i>	grass
hyper-	from Latin and Greek <i>hyper-</i>	over, to exceed, surpass, more than normal
hypo- (or hyp-)	from Latin and Greek <i>hypo-</i>	under, beneath, below or less than normal
ichthy- (or ichthyo-)	from Latin <i>ichthys</i>	fish
is- (or iso-)	from Latin and Greek <i>isos</i>	equal, uniform
-ist	from Latin <i>-ista</i> (or <i>-istes</i>)	someone who performs, makes, or specializes in
locate	from Latin <i>locatus</i> (or <i>locare</i>)	to find or fix the place
-logy	from Latin <i>-logia</i> (or <i>-logy</i>)	collecting, to gather, the study of
lucent	from Latin <i>lucere</i>	to shine through
micr- (or micro-)	from Latin and Greek <i>mikr-</i> (or <i>mikro-</i>)	small, short, minute
milli-	from Latin <i>milli-</i>	thousand, one thousandth
meter	from Latin <i>metrum</i>	measure, meter
-nomous (or -nomy)	from Greek <i>nomos</i>	law (govern, rule)
-onta (or -onto-)	from Greek <i>onta</i>	existing things
paleo- (or pale-, palae-, palaeo-)	from Greek <i>palai-</i> (<i>palaios-</i>)	ancient, long ago

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BASE WORD	WORD ORIGIN	ORIGINAL MEANING OF THE BASE WORD
pest	from Latin <i>pestis</i>	a plant or animal detrimental to man, to pester or annoy
phil- (or philo-)	from Greek <i>philos</i>	dear, friendly, loving
-phil (or -phile)	From Greek <i>-philos</i>	lover, loving
photo-	from Greek <i>phot-</i> (or <i>phos</i>)	light
-pod	from Greek <i>pod-</i> (or <i>podos</i>)	foot
prot- (or proto-)	from Latin <i>proto-</i> and Greek <i>prot-</i> (proto- or <i>pro</i>)	before, for, ahead, forward
-scope	from Latin <i>-scopium</i> and Greek <i>-skopion</i> (or <i>-scopos</i>)	to watch, look at, spy
-sect	from Latin <i>sectus</i>	to cut, to divide
spele-	from Latin <i>speleum</i> (or <i>spelunca</i>) and Greek <i>spelynx</i> (or <i>spelaion</i>)	cave
stalactite	from Latin <i>stalactites</i> and from Greek <i>stalaktos</i> (or <i>stalassein</i>)	dripping, to let drip
stalagmite	from Latin <i>stalagmites</i> and from Greek <i>stalagma</i> (or <i>stalagmos</i>)	drop, dripping
sub-	from Latin <i>sub</i>	under, close to
sui-	from Latin <i>sui</i> (or <i>suus</i>)	of oneself; one's own
syn- (or sym-)	from Latin or Greek <i>syn</i>	with, together with
synthesis	from Greek <i>synthēnai</i>	to put together
terra	from Latin <i>terra</i> (<i>terrestris</i> or <i>terrenum</i>)	land, earth, ground
-them	from Greek <i>therma</i>	deposit
therm- (or thermo-)	from Greek <i>therme</i> (or <i>thermos</i>)	heat, hot
-theses	from Greek <i>tithēnai</i>	to put, to place
trans-	from Latin <i>trans-</i> (or <i>tra-</i>)	Across, beyond, through, so as to change, cross over
troglo-	from Greek <i>trogle</i>	hole, cave
-vore (or -vour)	from Latin <i>vorac-</i> (<i>-vorus</i> , <i>-vorous</i> , or <i>vorare</i>)	to devour, to eat
xen (xene or xeno)	from Greek <i>xenos</i>	stranger, guest, host, foreigner
-zoa	from Latin <i>-zoa</i> or Greek <i>zoia</i>	animals



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COMMON TERMS IN MAMMOTH CAVE LITERATURE

Anthropologist.....	one who studies human beings
Arthropod.....	jointed foot
Artifact	made by human skill
Aquatic.....	water living
Autonomy	existing, or capable of existing, independently (self governing)
Bisect.....	divide into two (usually) equal parts; intersect
Carnivore	a flesh-eating animal
Centimeter	one hundredth of a meter
Centipede	a many-segmented arthropod. Each body segment contains one set of legs.
Decapod	ten footed
Echolocation	a process of locating distant or invisible objects by means of sound waves reflected back to the emitter by the object(s)
Florist.....	one who sells, or grows for sale, flowers and ornamental plants
Herbicide	an agent used to destroy or inhibit plant growth (Note: Herbicides cannot be used in a national park)
Herbivore	eating on plants
Ichthyologist.....	someone who studies fish
Isopod.....	small sessile-eyed crustacean with a body composed of seven free thoracic segments. Each segment contains a pair of similar legs.
Microfauna	small, minute animals invisible to the naked eye
Microscopic.....	invisible or indistinguishable without the aid of a microscope
Millimeter	one thousandth of a meter
Millipede	one thousand feet
Paleontologist.....	someone who studies fossils to learn about past geological periods
Pesticide	an agent used to destroy pests (Note: Pesticides cannot be used in a national park)
Photosynthesis	formation of carbohydrates in the chlorophyll-containing tissues (usually leaves) of plants
Protozoans	minute protoplasmic acellular or unicellular animals which have varied morphology and physiology, and often complex life cycles, which are represented in almost every kind of habitat. Some are serious parasites of man and domestic animals.
Speleology	the scientific study or exploration of caves
Speleothem	a cave formation
Spelunker	someone who makes a hobby of exploring or studying caves
Stalactite.....	a deposit of calcium carbonate resembling an icicle hanging from the roof or sides of caves
Stalagmite.....	a deposit of calcium carbonate, which looks like an inverted stalactite, formed on the floor of a cave by the drip of calcareous water
Subterranean.....	being, lying, or operating under the surface of the earth
Suicide.....	the act of taking ones own life voluntarily and intentionally
Terrestrial.....	of or relating to the earth; living on or growing from land
Thermal	of, relating to, or caused by heat
Translucent	clear; transparent; permitting the passage of light
Troglobite	"cave dwellers." Animals that spend their entire life in a cave and can live nowhere else. (Example: a blind cavefish or an eyeless crayfish)
Troglo-dyte	a member of a primitive people dwelling in caves
Troglo-philile	"cave lovers." Animals that can complete their entire life cycle in caves or in places outside of the cave if the habitat is dark and damp like a cave (Example: cave salamanders, a cave springfish, or sculpins)
Troglo-xene	"cave visitors." Animals that live only a part of their life in a cave. These creatures must periodically return to the surface for part of their living requirements - usually for food. (Example: bats or cave crickets)

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MEMORY CARDS

BI	TWO (LATIN)
CENTI	HUNDRED, HUNDREDTH (LATIN)
FAUNA	ANIMAL LIFE (LATIN)
FLORA	PLANT LIFE (LATIN)

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MEMORY CARDS

HERB	GRASS, PLANT (LATIN)
-IST	SOMEONE WHO PERFORMS, MAKES, OR SPECIALIZES IN (LATIN)
MILLI	THOUSAND, THOUSANDTH (LATIN)
-LOGY	COLLECTING, TO GATHER, THE STUDY OF (LATIN)

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MEMORY CARDS

SUB	UNDER, CLOSE TO (LATIN)
TERRA	LAND (LATIN)
THERM	HEAT, HOT (GREEK)
TROGLO	HOLE, CAVE (GREEK)

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CORE CONTENT

- PL-M-1.1.3** Communication, cooperation, rules, and respect are important to the effective functioning of groups.
- PL-M-1.1.1** Individuals have personal rights and responsibilities (e.g., cooperation, communication, patience) when dealing with others (e.g., families, classmates, teams).
- RD-H-4.0.12** Interpret the meaning of specialized vocabulary.
- RD-M-x.0.4** Know the meanings of common prefixes and suffixes to comprehend unfamiliar words.
- RD-M-x.0.3** Identify words that have multiple meanings and select the appropriate meaning for the context.
- RD-M-4.0.14** Interpret the meaning of specialized vocabulary.
- WR-M-1.4** Transactive writing is informative/persuasive writing that presents ideas and information for authentic audiences to accomplish realistic purposes like those students will encounter in their lives. In transactive writing, students will write in a variety of forms such as the following:
- letters
 - speeches
 - editorials
 - articles in magazines, academic journals, newspapers
 - proposals
 - brochures
 - other kinds of practical/workplace writing.
- Characteristics of transactive writing may include :
- text and language features of the selected form
 - information to engage/orient the reader to clarify and justify purposes
 - ideas which communicate the specific purpose for the intended audience
 - explanation and support to help the reader understand the author's purpose
 - well-organized idea development and support (e.g., facts, examples, reasons, comparisons, anecdotes, descriptive detail, charts, diagrams, photos/pictures) to accomplish a specific purpose
 - effective conclusions.