Morphology: An Exploration of Bases & Affixes to Build Spelling, Vocabulary, & Comprehension

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Framing Our Discussion

What the Research Says

Morphological awareness is a strong predictor of…

- reading ability.

- vocabulary knowledge.

- comprehension.

(Anglin et al, 1993; Carlisle, 2000; Berninger, Abbot, Nagy, & Carslisle, 2010; Carlisle &. Feldman, 1995; Kirby et al., 2012; Nagy & Anderson, 1984; Nagy et al., 2006 as cited in McKeown et al, 2017).

What the Research Says

Knowledge of morphology is useful for academic vocabulary development, both for comprehension and writing. This means it affects **Tier Two** vocabulary development.

One in three words you see for the first time is linked morphologically to something you already know, but that doesn't mean you'll know the word itself (Anglin et al (1993) as cited in McKeown et al (2017), 130). You need morphological awareness—or the ability relate an unfamiliar word to other, known words that share morphemes with it (70).

What the Research Says

We should develop morphological knowledge…

➤ to build word sense.

➤ to build literacy skills, including vocabulary and reading comprehension.

➤ to build knowledge in content.

➤ to build polysemy, or an understanding of multiple meanings, through the study of word families (60).

What the Research Says

A meta-analysis conducted by Bowers et al (2010) of 22 morphology studies found that morphology instruction benefits learners, especially less proficient readers.

Students have difficulty with transfer.

Morphological instruction that best develops word sense…
- is integrated with other aspects of literacy instruction.
- includes a problem-solving approach.

Three things to note from Louisa Moats' *Speech to Print*, Third Edition (2020)

The connection between her orthography and morphology chapters

Carol Chomsky's identification of English as "an optimal system for a reader" (Moats, 2020, 97)

This quote: "With systematic teaching, morphological awareness develops in tandem with phonological and orthographic awareness beginning in first grade" (Moats, 2020, 168).

# Terminology to Guide Instruction & Deepen Understanding

Important terminology

➢ morpheme – smallest part of a word that has meaning
➢ morphology – the study of these morphemes in words
➢ morphological awareness – the awareness that words are comprised of these morphemes

Words are made up of morphemes, including bases and affixes.

For this discussion, let's reserve the term *root* to refer to the *origin* of English bases and affixes, rather than actual English word parts.

Important terminology

➢ base – morpheme that holds the core
  meaning of a word
➢ free base – base that is a standalone word
  • tree, port
➢ bound base – base that only appears as part
  of a larger word
  • struct

base
morpheme that holds the core meaning of a word

free base	bound base
stands alone; often called base word	only appears as part of a larger word
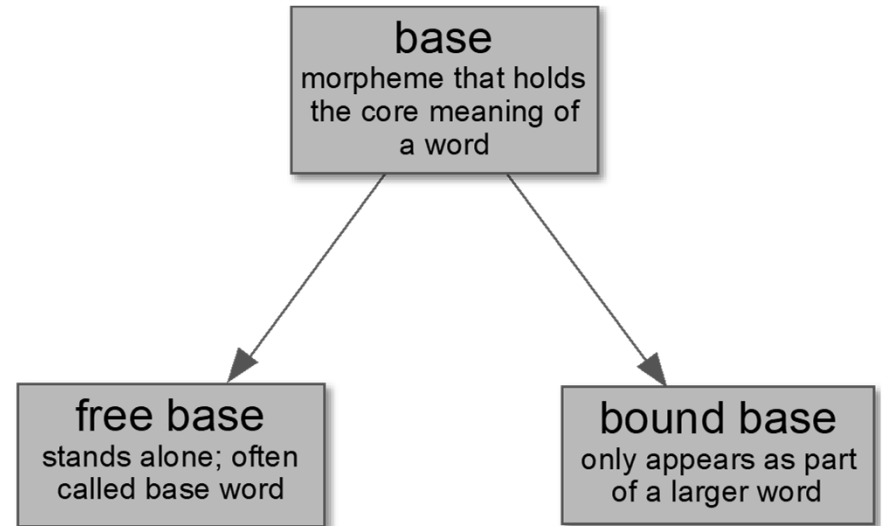
Affix

➤ affix – prefix or suffix that can be attached (or affixed) to a base

➤ In rewinding, re- and -ing are affixes.

➤ Since wind is a word, it is a *free* base.

affix
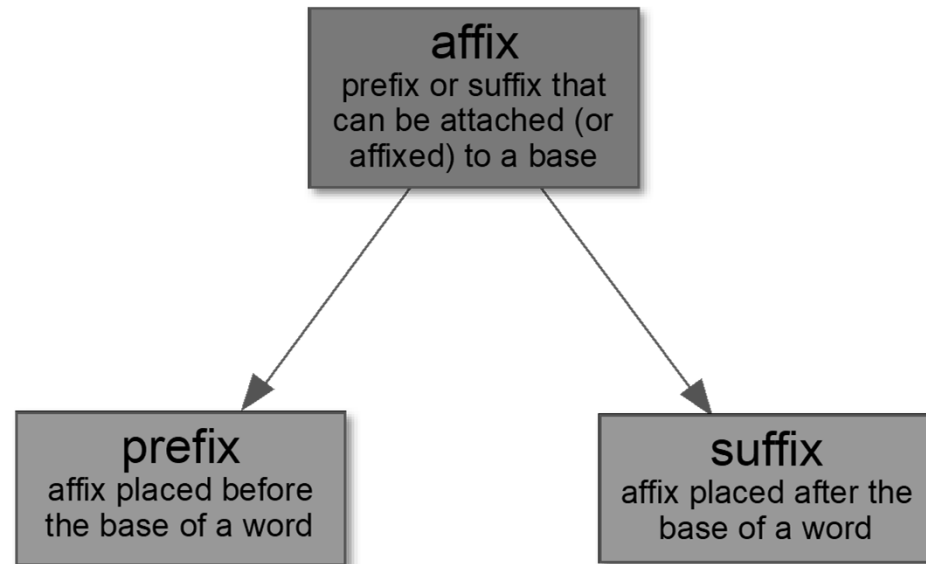prefix or suffix that can be attached (or affixed) to a base

re	wind	ing
prefix	free base	suffix

Prefixes & Suffixes

➤ prefix – affix placed before the base of a word

➤ suffix – affix placed after the base of a word

➤ In rewinding, re- is a prefix while -ing is a suffix.
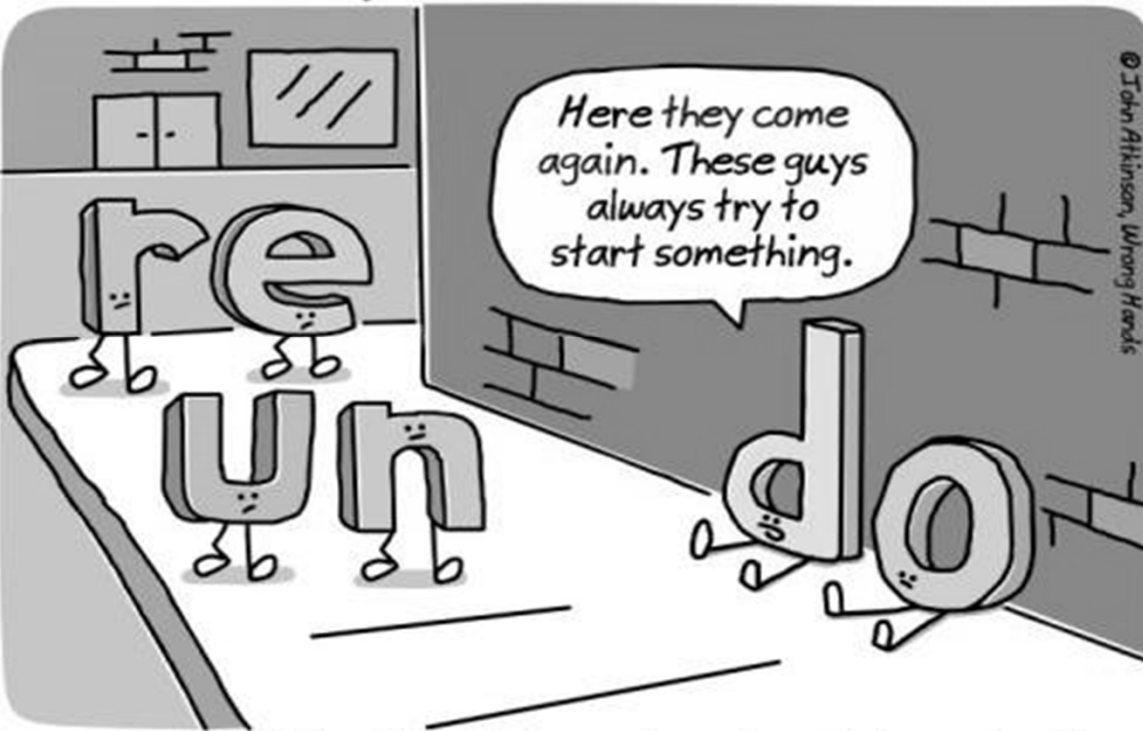
affix
prefix or suffix that can be attached (or affixed) to a base

prefix
affix placed before the base of a word

suffix
affix placed after the base of a word

| re	wind	ing
prefix	free base	suffix

Derivational & Inflectional Suffixes

➢ derivational – affix that creates a new word while modifying the basic meaning
  • act to active
    noun/verb to adjective
  • instruct to instructor
    verb/action to someone who does that action
➢ inflectional – affix that creates a different form of the same word – no meaning change
  • great to greater (both adjectives)
  • jump to jumped (both verbs)

affix
prefix or suffix that can be attached (or affixed) to a base

prefix
affix placed before the base of a word

suffix
affix placed after the base of a word

derivational
affix that creates a new word while modifying the basic meaning

inflectional
affix that creates a different form of the same word
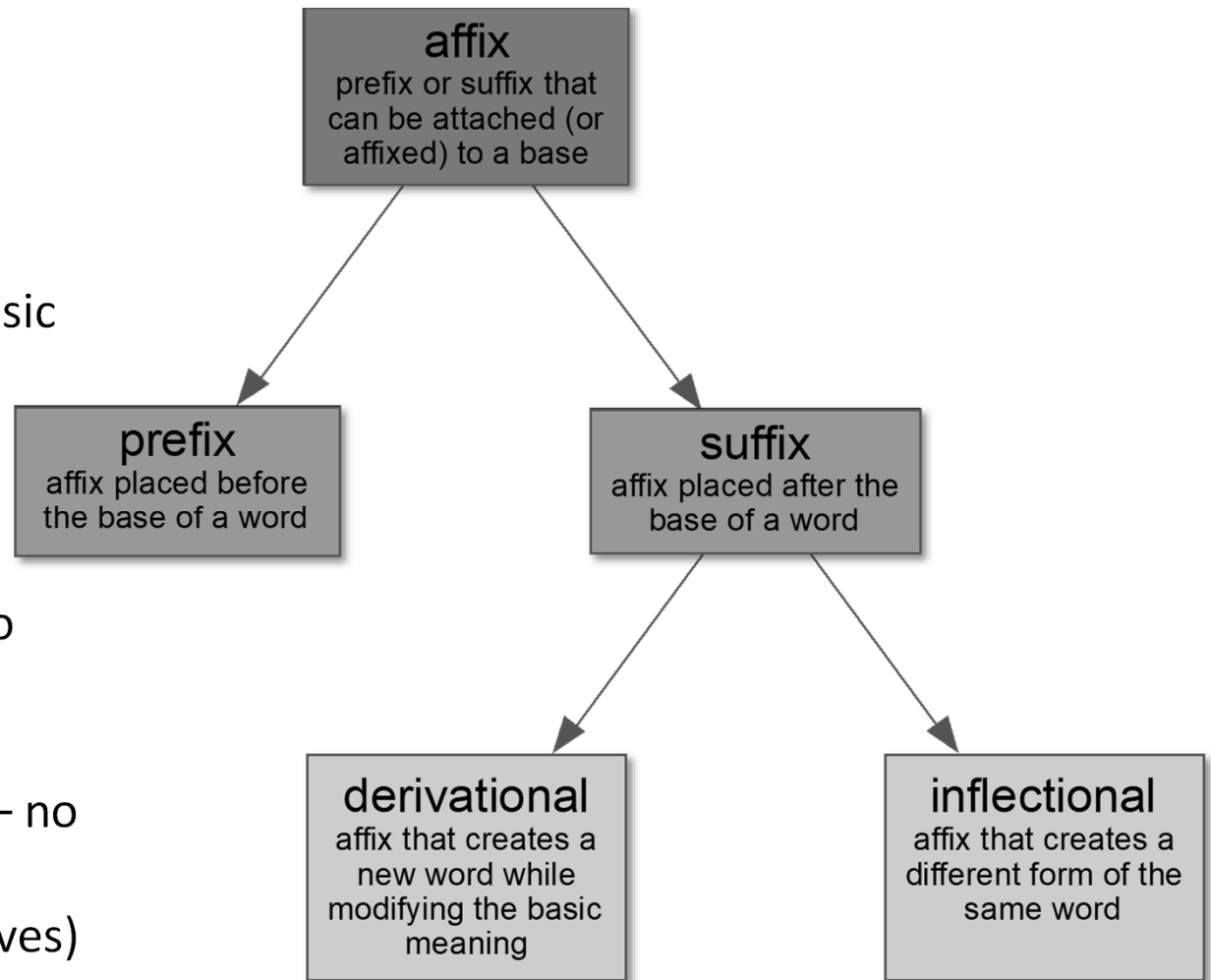
Derivational & Inflectional Suffixes

➤ By the way, since prefixes create a new word and modify the basic meaning, they're derivational as well!

affix
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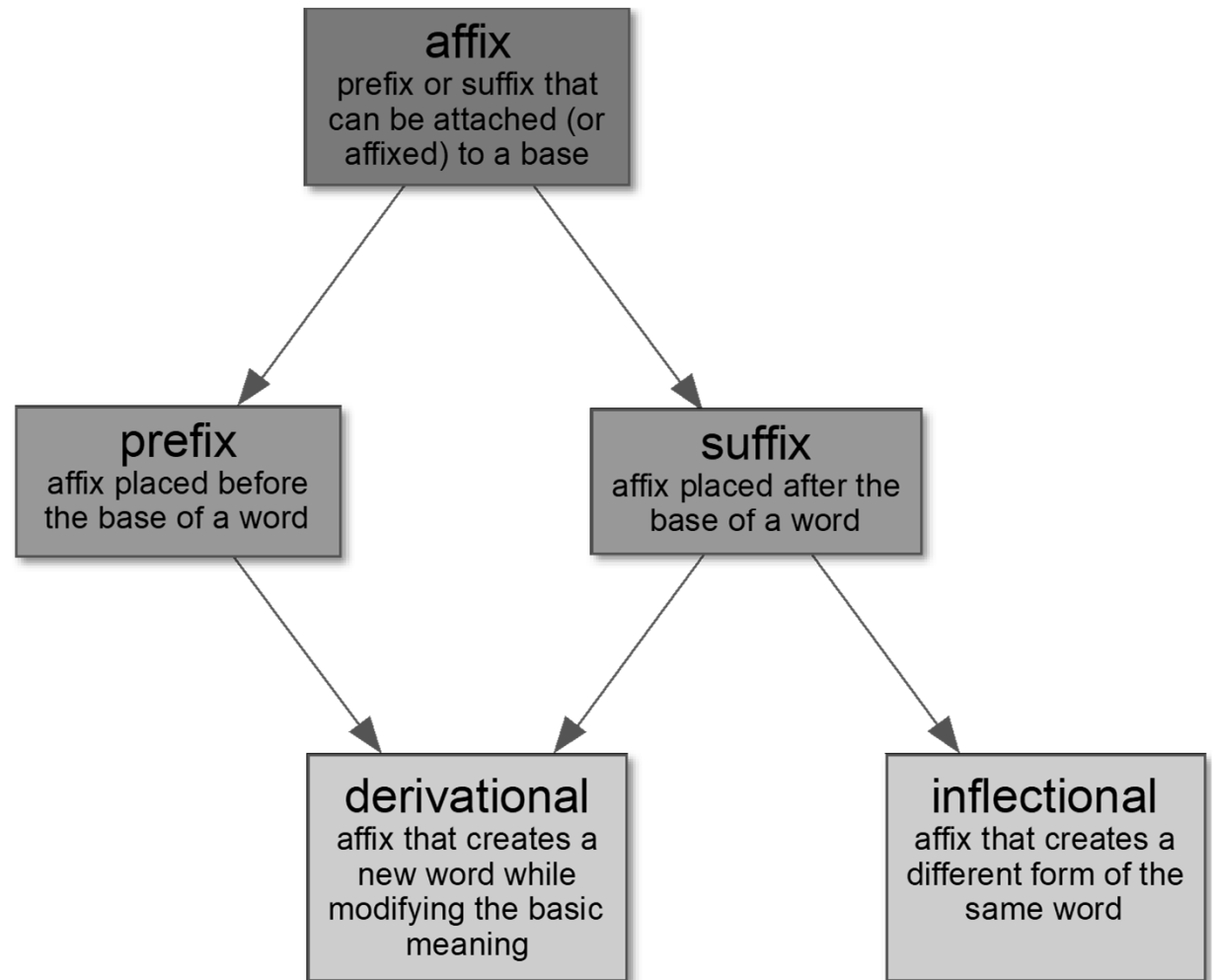
Application

Let's apply our knowledge to a few words.

You may have immediately noticed under- as a prefix in our word, <u>underactive</u>. Its meaning is transparent as well. Did you also notice that -ive is a suffix that can be separated from the base act? -ive usually marks adjectives, in words like <u>supportive</u> and <u>festive</u>. Remember that we call it a *free* base as it's a standalone word.

under	act	ive
prefix	free base	suffix

con	struct	ion
prefix	bound base	suffix

Application

In <u>construction</u>, struct is a bound base. It means "build" and forms the core meaning in dozens of words, like <u>indestructible</u> and <u>restructure</u>, but it cannot stand by itself as a word. Only with a prefix or suffix attached does it become a word; hence, the base is *bound* because it can not stand alone as its own word. Con- forms the prefix and means with or together; -ion is a common suffix that forms nouns.

under	act	ive
prefix	free base	suffix

con	struct	ion
prefix	bound base	suffix

What to Focus Attention On

20 prefixes and 30 suffixes account for the majority of derived forms (Graves 2004; Krovetz, 1993 as cited in McKeown 2017, p. 14).

That said, knowing the meaning of a prefix won't give you the meaning of a word, but knowing the base—and seeing how prefixes manipulate its meaning—can be illuminating (Baurer & Nation, 1993; Nagy, Anderson, Schommer, Scott, & Stallman, 1989; Nagy & Hiebert, 2010).
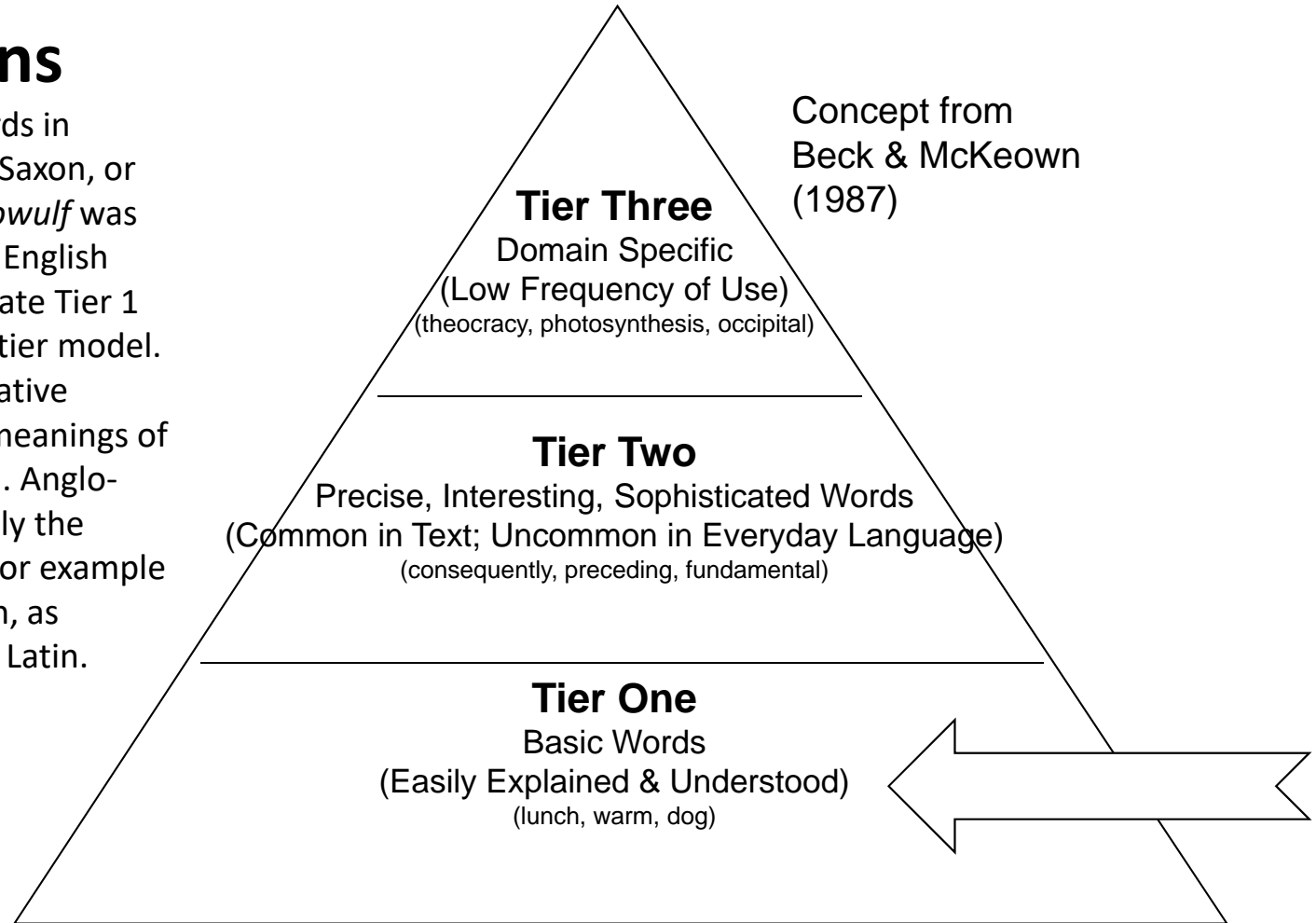
Using this base-focused approach will provide multiple exposures to the essential affixes in a variety of applications, so you're likely to learn them anyway.

A Little History

Anglo-Saxon Lens

Many of the most common words in English are derived from Anglo-Saxon, or Old English. The epic poem *Beowulf* was written in Old English. Modern English words from Anglo-Saxon dominate Tier 1 in Beck, McKeown et al's three-tier model. They are common words that native English speakers will learn the meanings of incidentally, without instruction. Anglo-Saxon derived words are typically the simpler way to say something, for example "turn on," from the Anglo-Saxon, as opposed to "activate," from the Latin.

Concept from
Beck & McKeown
(1987)

Tier Three
Domain Specific
(Low Frequency of Use)
(theocracy, photosynthesis, occipital)

Tier Two
Precise, Interesting, Sophisticated Words
(Common in Text; Uncommon in Everyday Language)
(consequently, preceding, fundamental)

Tier One
Basic Words
(Easily Explained & Understood)
(lunch, warm, dog)
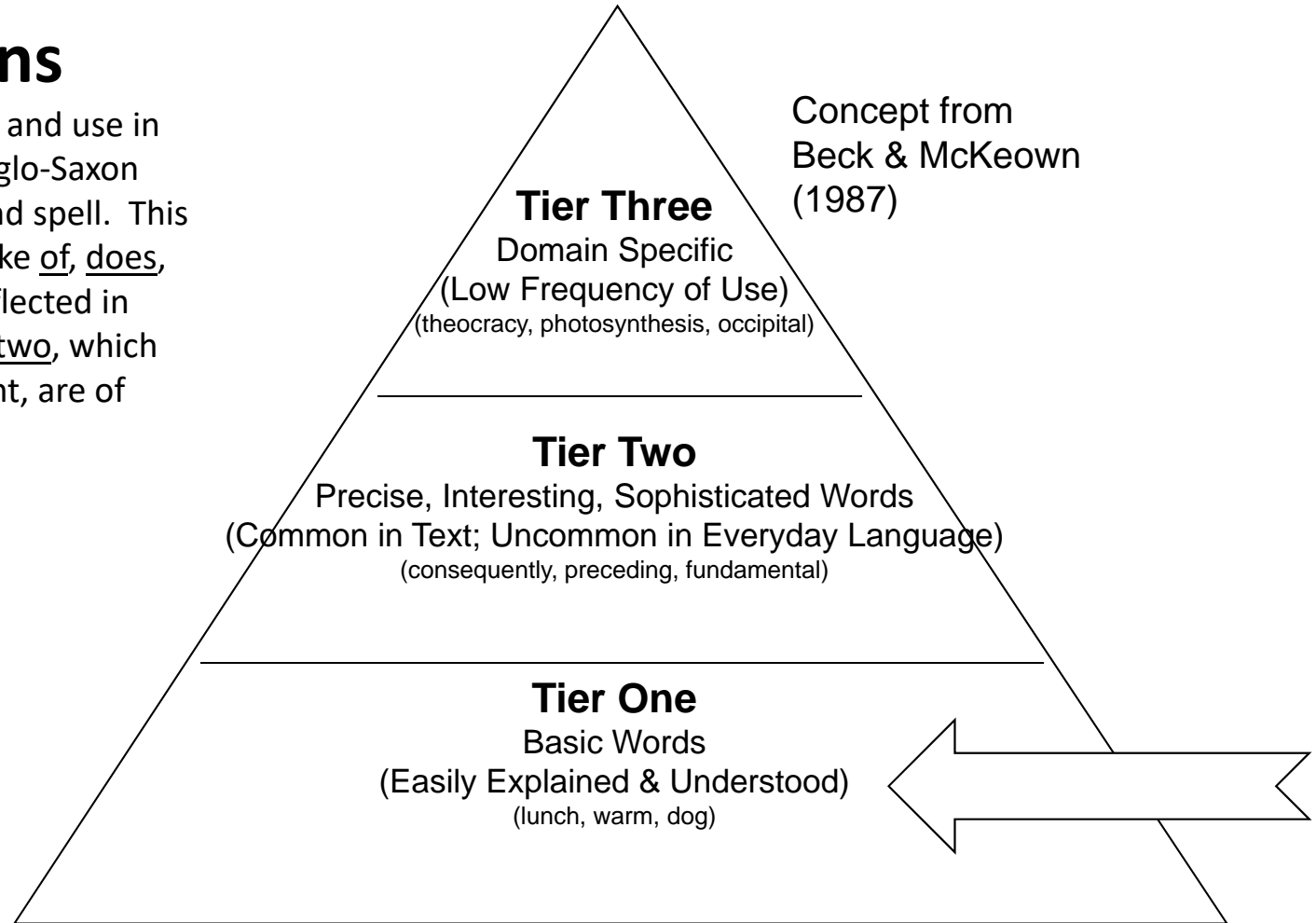
Anglo-Saxon Lens

Although they're easy to define and use in speech, words derived from Anglo-Saxon are often challenging to read and spell. This is because a number of them, like <u>of</u>, <u>does</u>, and <u>from</u>, have spellings not reflected in their pronunciations. <u>One</u> and <u>two</u>, which we examined in the last segment, are of Anglo-Saxon origin.

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the first page of Beowulf in Old English

Latin Lens

It is amusing that the majority of words that make up English vocabulary aren't even originally from English; instead, they're borrowed from other languages.

English takes more words from Latin, some by way of French, than any other language.

Many of the high-impact, Tier 2 words are derived from Latin.

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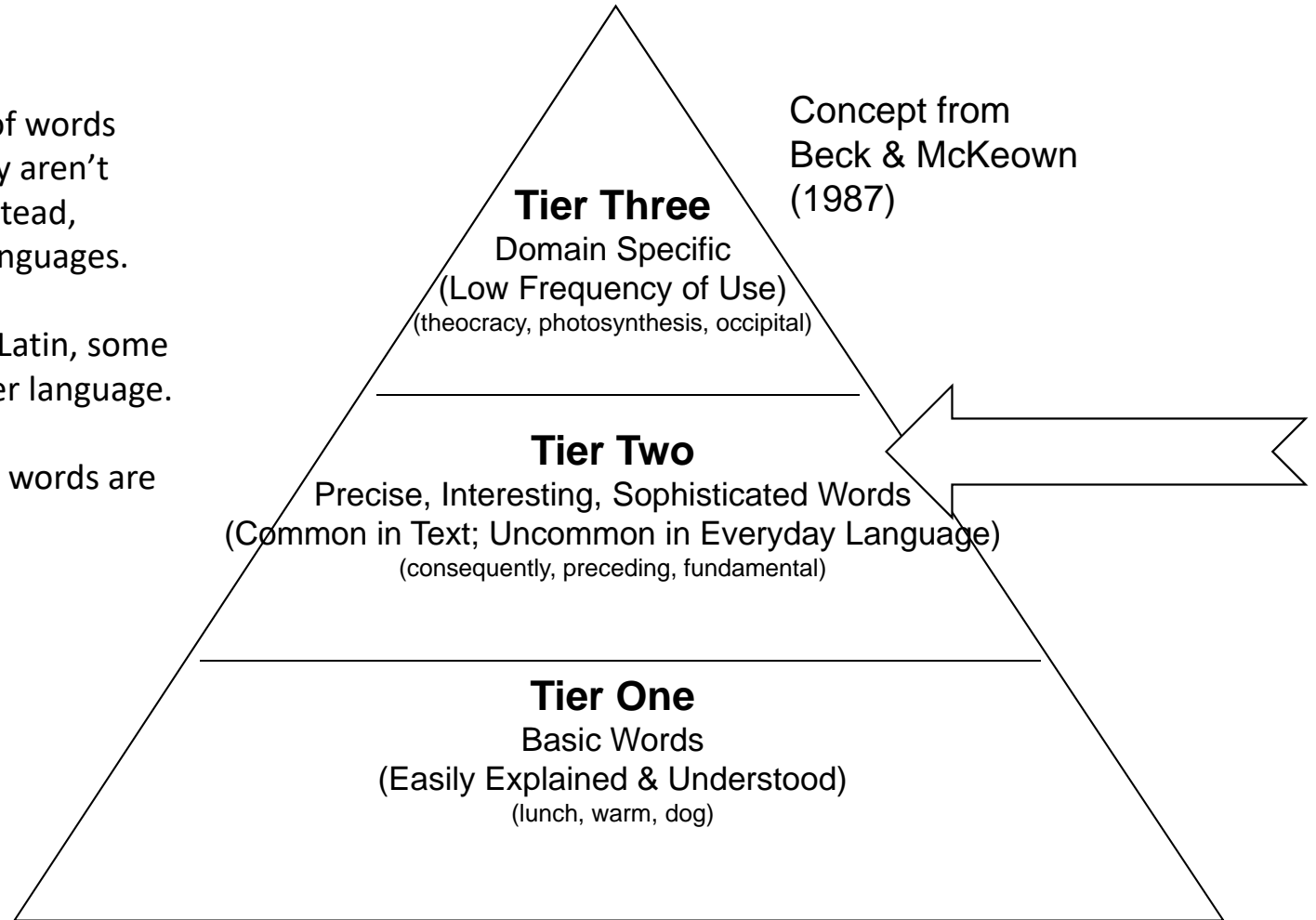
Latin Lens

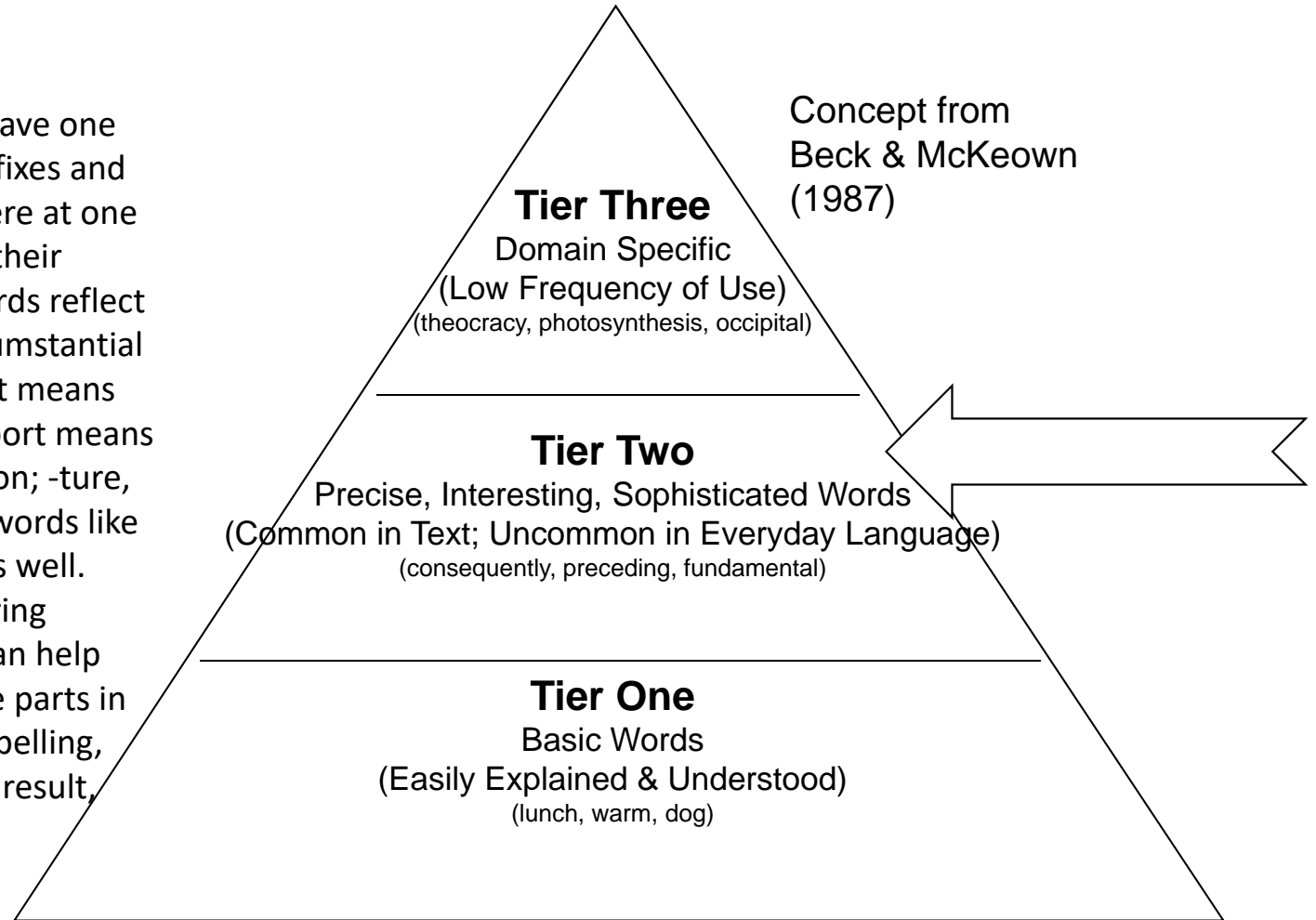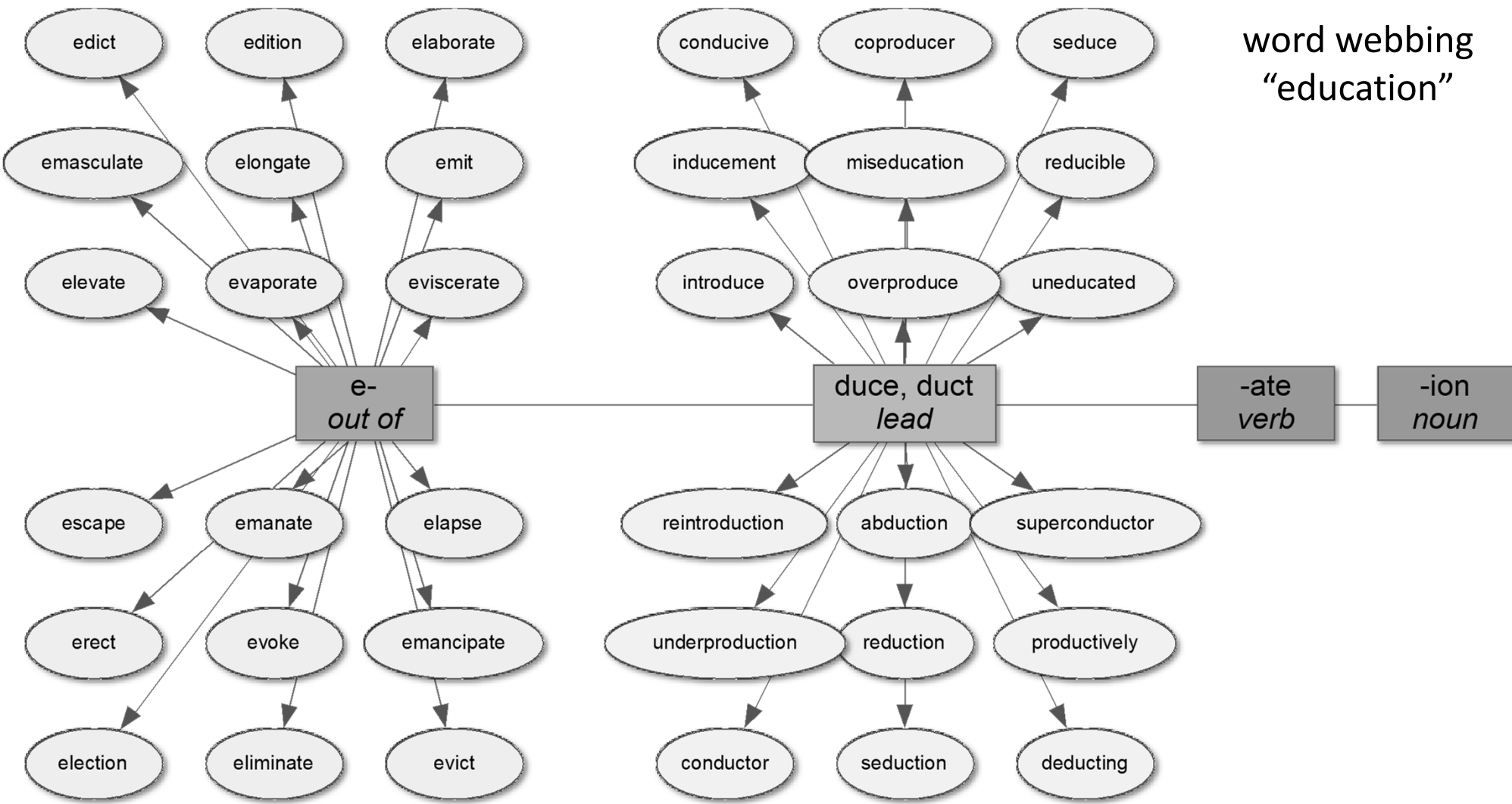Words of Latin origin typically have one base and can have multiple prefixes and suffixes. A lot of the prefixes were at one time prepositions in Latin, and their meanings in current English words reflect this fact. So the circum- in circumstantial means around, the ob- in object means against, and the trans- in transport means across. Final stable syllables -tion; -ture, and -ive appear in Latin-based words like nation, adventure, and active as well. Practice with commonly appearing features in Latin based words can help with students' awareness of the parts in words, a skill that is useful for spelling, decoding, vocabulary, and, as a result, comprehension.

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word webbing
"education"

edict

edition

elaborate

conducive

coproducer

seduce

emasculate

elongate

emit

inducement

miseducation

reducible

elevate

evaporate

eviscerate

introduce

overproduce

uneducated

e-
out of

duce, duct
lead

-ate
verb

-ion
noun

escape

emanate

elapse

reintroduction

abduction

superconductor

erect

evoke

emancipate

underproduction

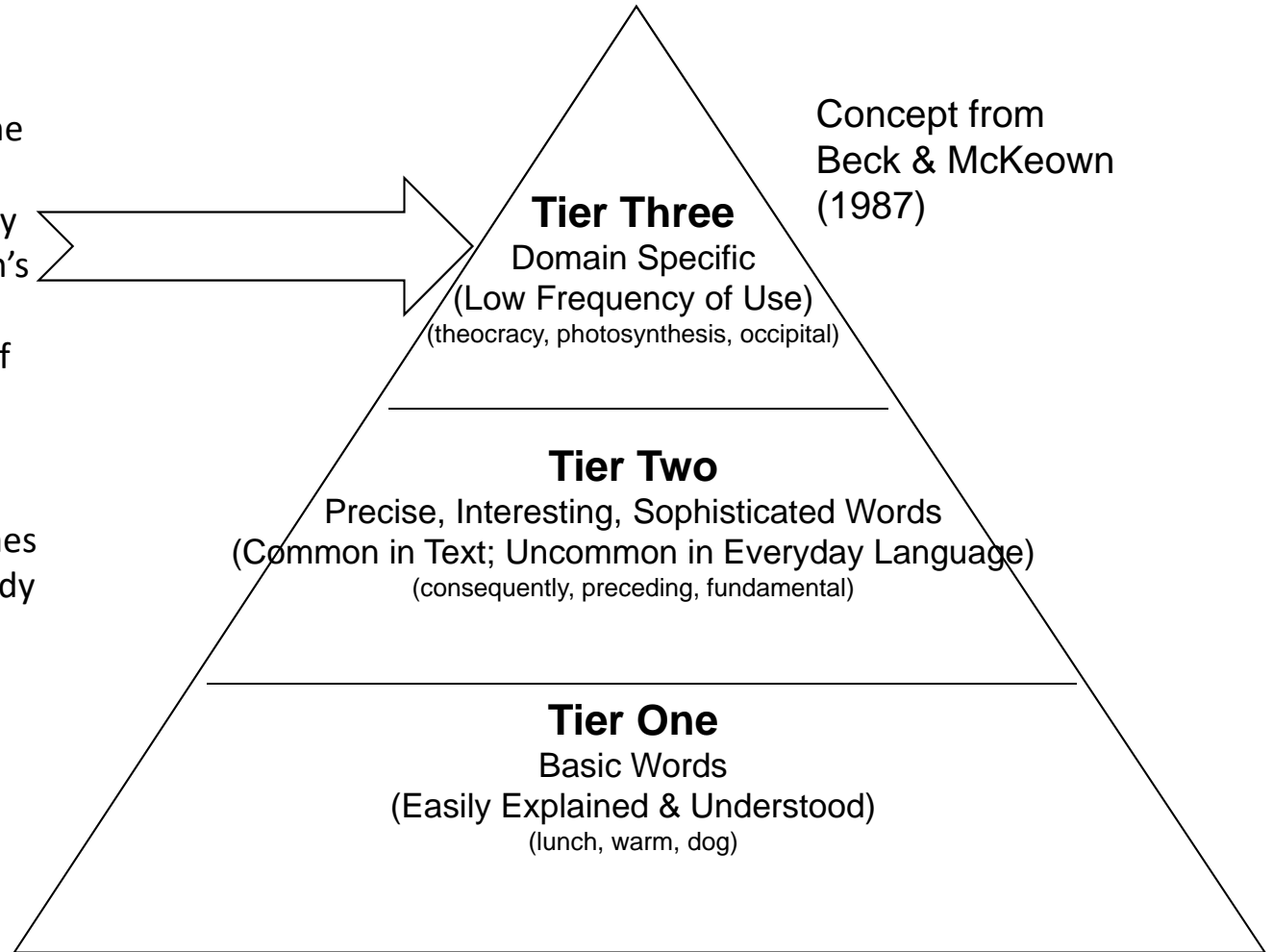reduction

productively

election

eliminate

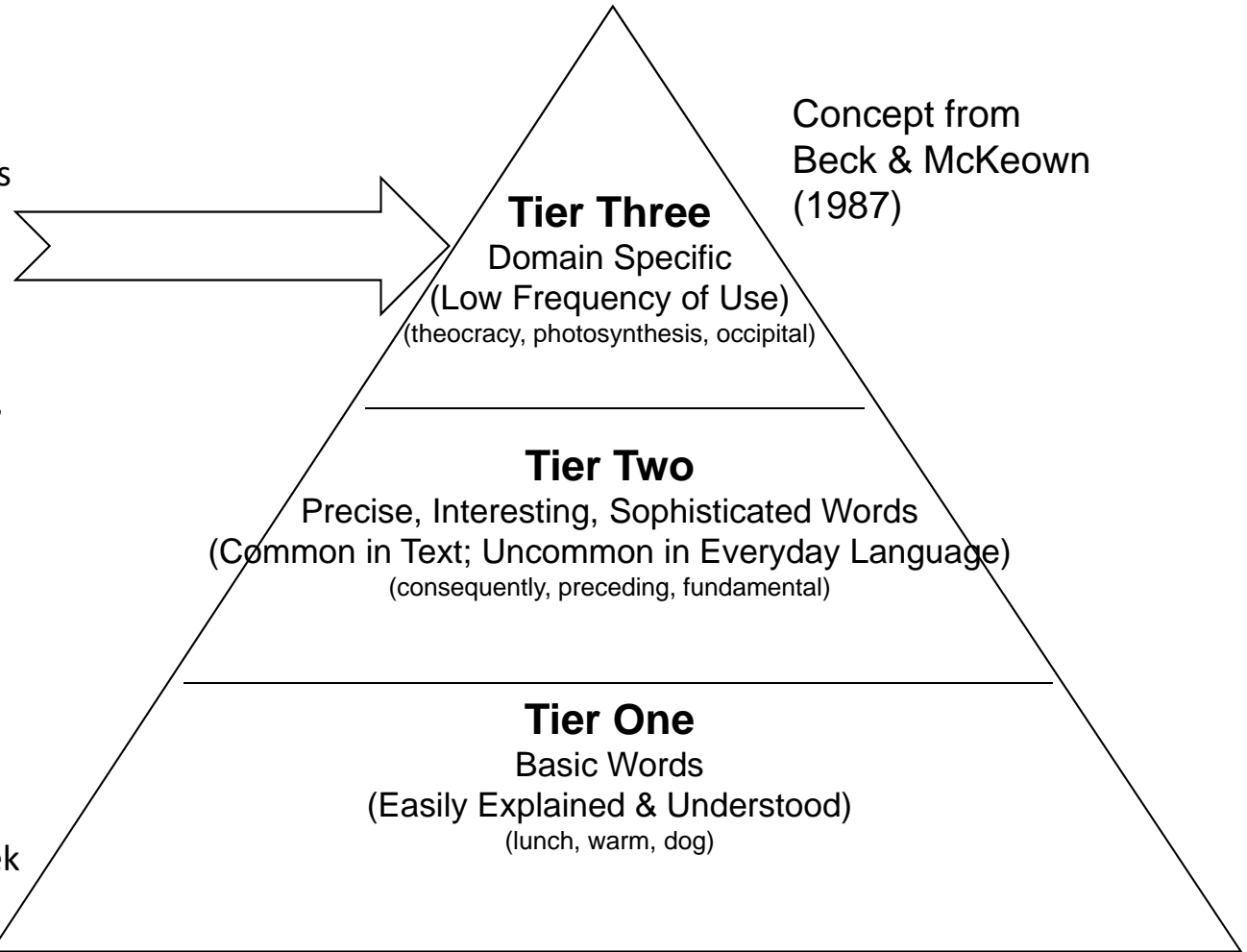evict

conductor

seduction

deducting

Greek Lens

Many English words derived from the Greek—often involving science, school, and the arts—would typically fall into Tier 3 in Beck and McKeown's model because they are specialized and domain-specific. A great deal of science and math terminology in particular derives from the Greek. Instructors teaching in these areas may find a study of Greek morphemes fruitful as a means of enhancing study of a particular subject.

Concept from Beck & McKeown (1987)

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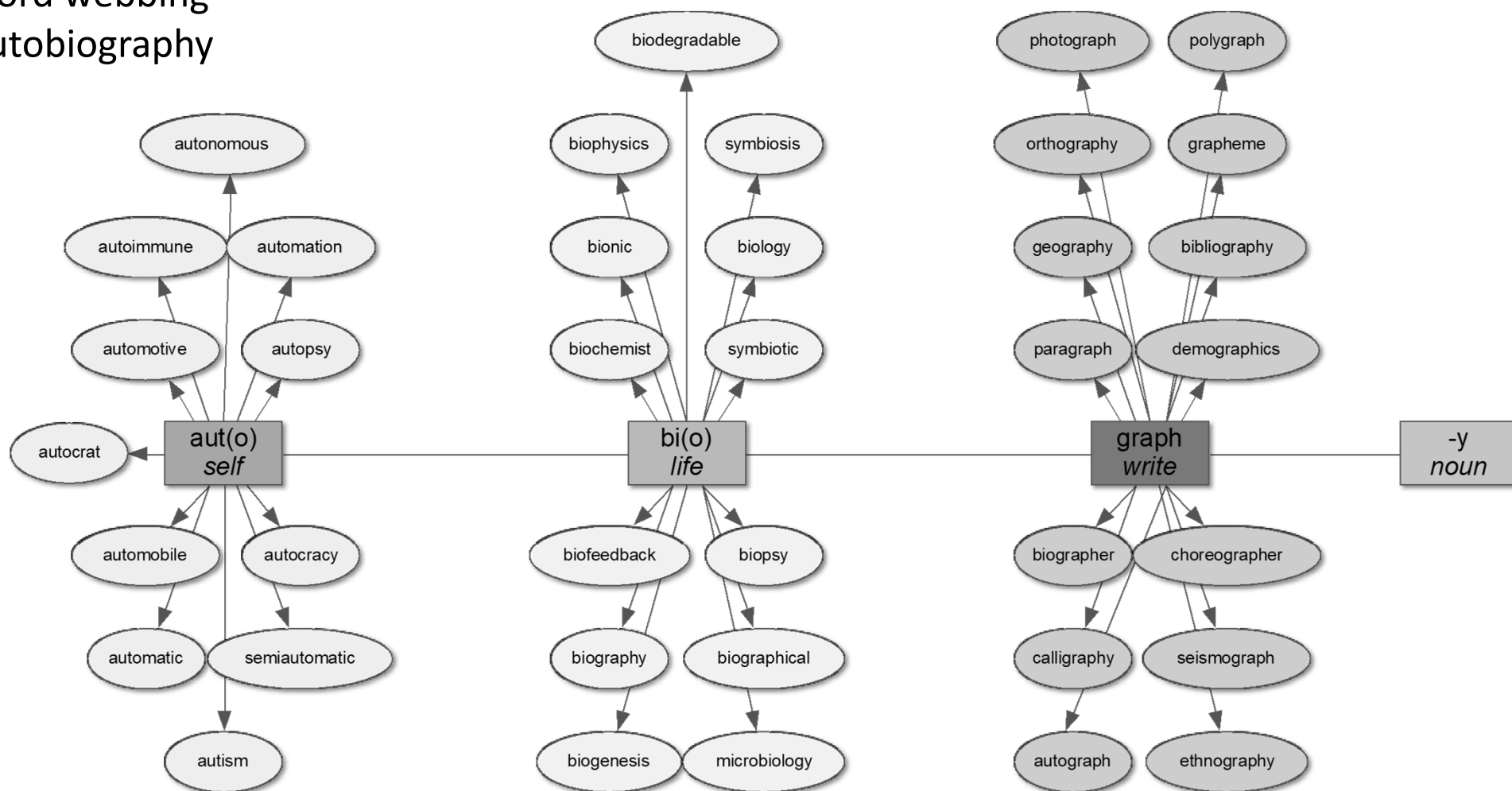(Easily Explained & Understood)
(lunch, warm, dog)

Greek Lens

Certain orthographic (or spelling) features are common in English words of Greek origin. For example, ph to say /f/ as in phobia, phonics, and typhoon is Greek. Y to replace i is another feature of Greek-based words, as in mythology, cyclone, gym, and type. When ch says /k/ it also suggests a word of Greek origin, as in school, monarch, and orchid. The reader will see a number of such words on each page of any science or mathematics text. Students will find them in psychology, health, agriculture, and history texts as well. 60% of the English language is comprised of words of Latin and Greek origin, but that number rises to 90% when you just look exclusively at the specialized vocabulary of science and technology.

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word webbing
autobiography

Meaning Trumps Pronunciation

One

Some of the most difficult words to address for younger and struggling learners are those whose spelling (orthography) is not reflected in their pronunciation.
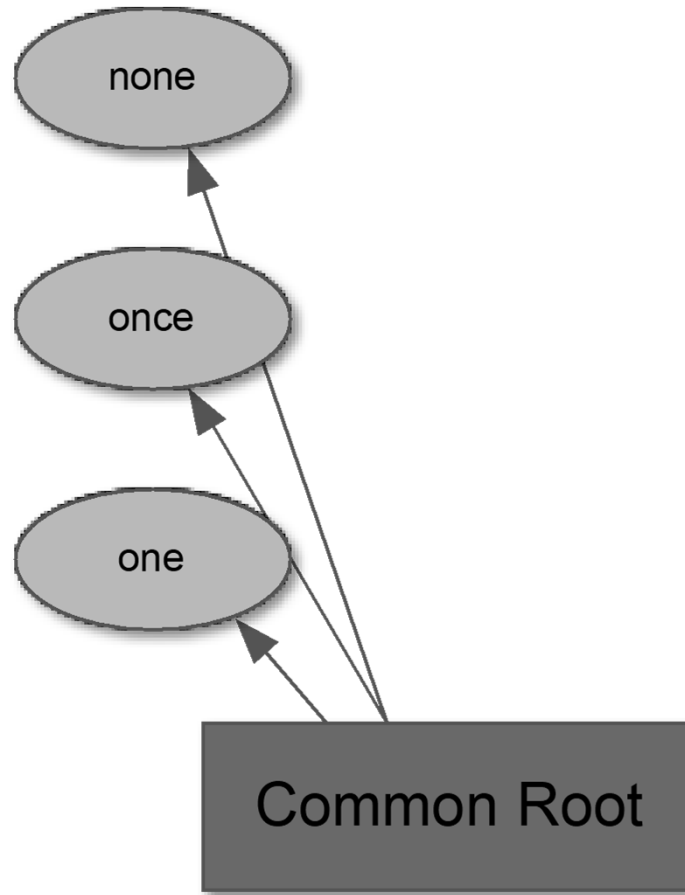
Consider the word *one*. If its orthography reflected its phonology, it would rhyme with *bone*, *stone*, and *phone*.

one

One (continued)

While the meaning link between *once* and *one* is obvious, when students learn the connection between *none* (literally no one) and *one*, they can make even deeper connections.

One (continued)

Interestingly, in other words derived from the same common root, the orthography is reflected in the pronunciation, hence *lone* and *alone* (all + one). Making the meaning connection between *one*, *alone*, and *lonely* can help struggling spellers make a better spelling choice since in those words the o-n-e is pronounced as one would expect.

Older students can learn the meaning of *atone* (literally at one) and cement their understanding of that word even as they cement the correct spelling of its simpler sister, one.
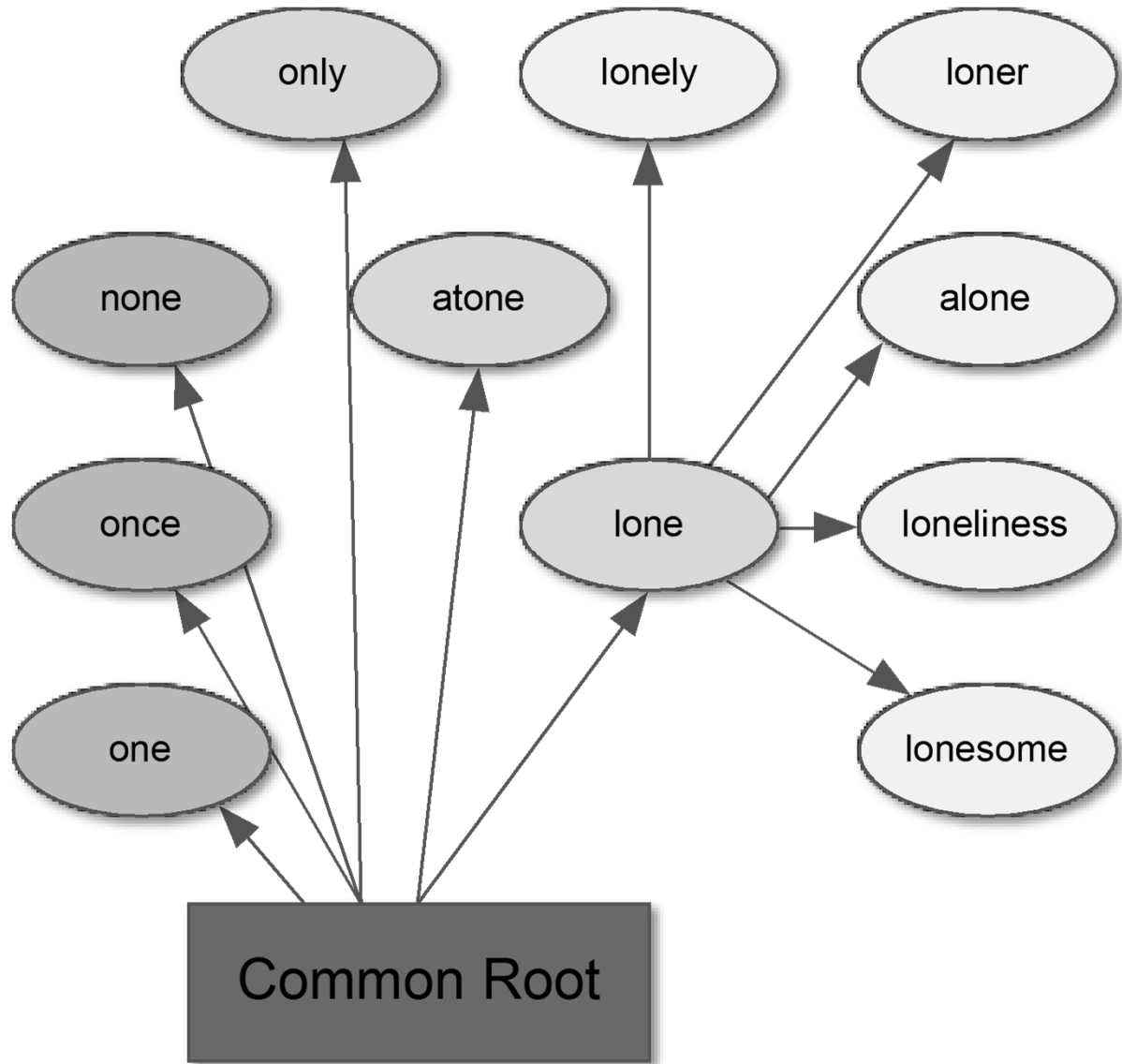
Two

Another good example is the number *two*. While students will understand its meaning, its pronunciation and spelling may prove difficult. Its spelling, or <u>orthography</u>, is not reflected in its pronunciation—/too/.

two

Two

Interestingly, in other words derived from the same common root, the orthography is reflected in the pronunciation, hence *twin*, *twice*, *twelve,* and *twenty*.

Consider also *twine* (made of two interwoven strands), *between* and *betwixt* (two things), and *twig (*a single limb splitting off from the main trunk).

Making the morphological connection between *two*, *twin*, and *twice* can help struggling spellers make better a better spelling choice.
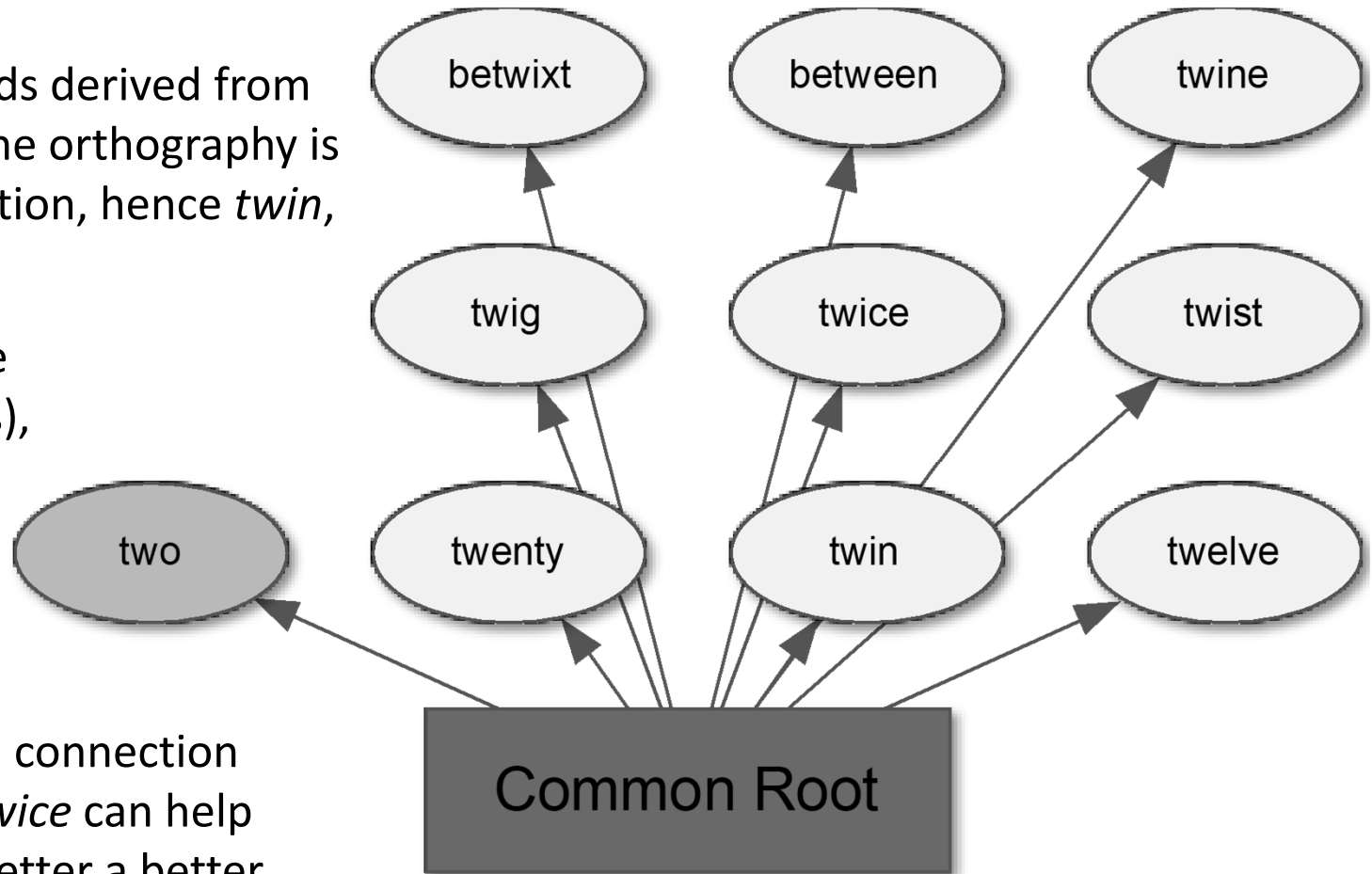
betwixt

between

twine

twig

twice

twist

two

twenty

twin

twelve

Common Root

Cheese, Give, & More

Why does give have an e?
Why does lease have an e?
It's crazy, isn't it?

Right	Wrong	Why
cheese	chees	
give	giv	
tease	teas	
relative	relativ	
groove	groov	

Cheese, Give, & More

Why does give have an e?
Why does lease have an e?
It's crazy, isn't it?

Right	Wrong	Why
cheese	chees	Distinguishes from plural
give	giv	English words don't end in v.
tease	teas	Distinguishes from plural
relative	relativ	English words don't end in v.
groove	groov	English words don't end in v.

From Louisa Moats...

"We can make sense of orthography by assuming that almost all letters in a printed word have a functional relationship to sound and/or meaning."
(Moats, 2020, 106)

Morphé: Meaning Trumps Sound

The base morph means "form or shape" and comes from the Greek root *morphé*, which means "form, shape; beauty, outward appearance."

I love this because it emphasizes the **appearance** *(letter configuration)* rather than **pronunciation** *(sound configuration)* of these morphemes.

As Louisa Moats noted in her seminal article, "How Spelling Supports Reading" in *American Educator*, "Meaning trumps pronunciation in the spelling of hundreds of English words" (16).

base	word #1	word #2
heal	heal	health
please	please	pleasant
spire	inspire	inspiration
port	report	opportunity
sign	sign	signal

Morphé: Meaning Trumps Sound

Here are some additional engaging examples. Note that the *pronunciations* don't match, but the *spellings* make perfect sense. Consider heal but health; please but pleasant, inspire but inspiration, report but opportunity, and sign but signal.

Thinking about meaning partners may help not only with vocabulary but also spelling.

base	word #1	word #2
heal	heal	health
please	please	pleasant
spire	inspire	inspiration
port	report	opportunity
sign	sign	signal

The Matrix

A Reminder

If you'll remember, I mentioned that Bowers et al's meta-analysis identified a "problem-solving" approach as essential to helping students apply their morphological growth to actual vocabulary and comprehension instruction.

In other words, teaching students to investigate words and their parts has a much better effect than helping students memorize a bunch of morphemes.

One way to effect this problem-solving approach is to use word matrices and their corresponding word sums. You can facilitate student work with matrices by hand, using pen and paper, but Ramsden's matrix maker also allows you to generate on the computer matrices using word sums. I'd like to share with you the general concept of matrix making here.

con				
de				
re				
se				

duce

lead

mis		
re	e	
un		

| re | in | |
| | intro | |

| over | pro | |
| re | | |

| ate | ed | |
| | ing | |

| | ion | al | ly |

| er |
| ible |
| ment |

| ive | ness |

A sampling of word sums created from the matrix at left:

in + duce → induce

un + e + duce + ate + ed → uneducated

re + duce → reduce

pro + duce + er → producer

con + duce + ive → conducive

re + intro + duce → reintroduce

Created with Mini Matrix-Maker, at www.neilramsden.co.uk/spelling/matrix

Left matrix (duce)

con / de / re / se			ate — ed
			ion — al — ly
mis / re / un	e	**duce** lead	er / ible / ment
re	in / intro		
co / over / re	pro		ive — ness

The base duce has a twin base, duct. They share a common root, ducere, which has another form, ductus (Latin – "lead").

Right matrix (duct)

ab / de / re / se			ed / ile / ing / ion / or / s
non / super	con	**duct** lead	
re	intro		
co / post / re / un / under	pro		ive — ly / ness

Created with Mini Matrix-Maker, at www.neilramsden.co.uk/spelling/matrix

conversationally — a four-suffix word!

con	**verse** "to turn"	ate	ion	al	ly

uncompromising – a three-prefix word!

un	com	pro	**mise** "to send"	ing

prefixes

chameleon (assimilated) prefix

in-	con-	ad-	sub-	ex-
im-	com-	as-	suf-	
il-	col-	at-	sup-	ef-
ir-	co-	ar-	sus-	
ig-	cor-	af-		

inter-	de-	pre-
re-	un-	enter-
Per-	mis-	ob-
trans	non-	

bases

bound base

nect	dens	tent	hap
sum	plete	lect	rect
tain	oper	fect	miss
tract	spect		
flect	ject	rive	nore

caut

e- rupt -ion

free base

see	fix	say	go
fox	flex	pack	have
agree	bank	move	pay
verb	do	time	be
lay	sign	play	real
form	claim	please	main

suffixes

vowel suffix

-ing	-ent	-al	-y
-age	-ed	-ant	-es
-able	-ee	-o	-en
-ial	-ish	-est	-ous
-ure	-er	-or	-en
	-ate	-ible	-it

-ate

consonant suffix

-less	-ly
-ne	-s
ment	-ful
-t	-ness

non	de			
in	**script**	ed		
manu	write	ion		
pre		s		
sub		ure		
super				
trans				
un				

de		ed	
in	**scribe**	ing	
pre	write	s	
sub			
trans		er	s

		ent	ial	s
		ible	ity	
dis	**crede**	it	ed	
in			s	
			or	s

non	con	al		
		ance		
de		ant		
in	**form**	ed		
mal		er		
per		ist		
re		less		
trans		ate	ion	
uni		ule	a	

	time		
in	**flex**	ed	
re	bend	es	
		ing	
	ible	y	

Wrapping Up the Matrix & Word Sums

Students at all grade levels have found problem-solving using morphological awareness, constructing and deconstructing words, and exploring how their origins impact their meaning useful.

Matrices and word sums are effective tools in this work. Pete Bowers, in *Teaching How the Written Word Works*, really develops this kind of thinking. Teachers will find his work insightful because it explores how to use morpheme work to build reading, spelling, vocabulary, and comprehension in students in a way that is both effective and engaging.

Building a Lesson in Morphology

Developing a Lesson

In our segment on general vocabulary instruction, we looked at the importance of word selection. Picking high-impact words that have multiple applications, that allow for interesting word play using attributes like polysemy, and that foster in students the meta-linguistics necessary to build the skills necessary to develop vocabulary independent of teacher guidance are essential ingredients of words worthy of investigation.

Since this segment is on morphology in particular, I'd like to share what a lesson in morphology might look like. Let's look together at a word that complements concept instruction in a content area other than E.L.A. for this project. Something from science, social studies, or mathematics, since a good deal of the high-impact, multi-morpheme words occur in these content areas.

Developing a Lesson

Find an appropriate word, hopefully from a studied text. This is an important and time-consuming portion of teacher preparation because word selection is both challenging and important.

For the sake of our discussion today, I'm going to look at the word <u>symmetrical</u>, a rich word that is essential not only in the core subject of math but also potentially science and a variety of advanced subjects, such as architecture and the visual arts.

Symmetrical is a rich word to mine. It has several morphemes that form key components of a number of English words. Let's look more deeply.

Greek Origins

This word has a number of features that indicate its Greek origin, including the prefix sym-, the y functioning as an i in that prefix, the common suffix -ic, and the fact that this word is tied to science, school, and, frankly, the arts.

A Quick Look at Etymonline

A quick look at Etymonline, an excellent resource for uncovering the origins of words, yields some important information to those who might be unfamiliar with the meaning parts in this word.

sym	metr	ic	al
prefix	bound base	suffix	suffix

Now Let's Look at the Morphemes

The suffixes -ic and -al indicate an adjective. While part of speech might be of no concern to a science or mathematics instructor, understanding that this word is an adjective allows students in those subjects to use it accurately.

sym	metr	ic	al
prefix	bound base	suffix	suffix

You don't say, for example, "The features of symmetrical are impressive in Roman architecture." You would use the word <u>symmetry</u> instead. But you *can* use symmetrical in a question like, "Are these two triangles symmetrical?" Knowing that symmetrical describes things, like triangles—in other words that it's an adjective—is useful for expressive language.

Now Let's Examine the Base

The base metr has a sister form you're very familiar with, meter. As you're probably aware, both mean measure, and these are morphemes that appear in dozens of English words.

sym	metr	ic	al
prefix	bound base	suffix	suffix

Since metr is our base, it makes sense to focus primary instructional time on it, using the affixes in symmetrical to show how metr changes when connected to other meaning parts.

Metr Words

Leading students to investigate other metr words, such as geometric, telemetry and diametrically and then to explore how their meanings relate to the meaning measure provides a rich vocabulary-linked lesson.

Word Sums

Word sums show the morpheme parts that build complex, Tier 2 words. While metr is our focus morpheme here, these words open doors to other worthwhile morphemes. Consider psych (mind) and tri (three), and bio (life), all of which show up in various metr words.

dia + **metr** + ic + al + ly → diametrically
tele + **metr** + y → telemetry
is + o + **metr** + ic → isometric
tri + gon + o + **metr** + y → trigonometry
sym + **metr** + y → symmetry
a + sym + **metr** + ic + al → asymmetrical
psych + o + **metr** + ic + s → psychometrics
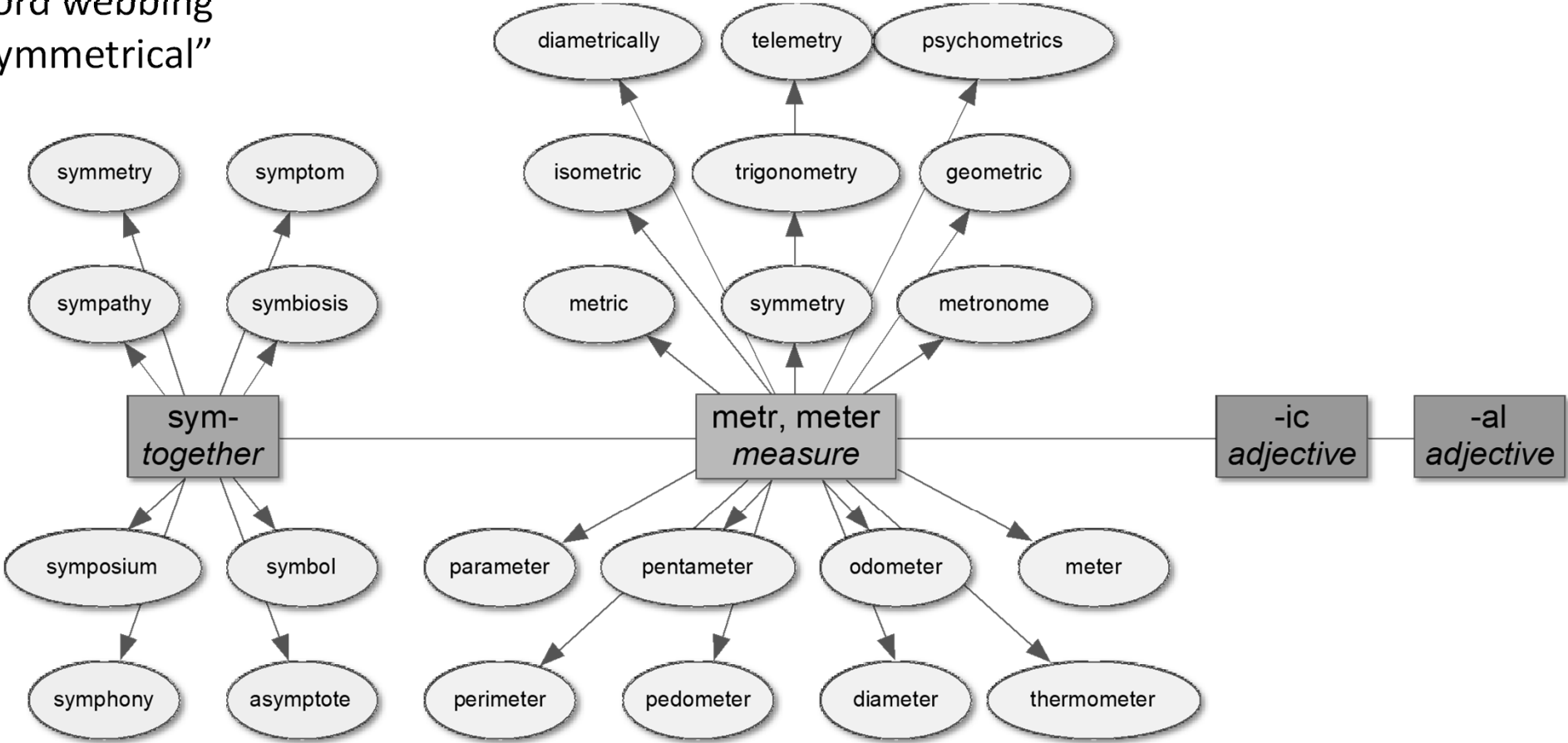**metr** + o + nome → metronome
bi(o) + **metr** + ic + s → biometrics

Word Matrix

Here's a matrix, built from the sums I just showed you. What makes the matrix such a compelling tool is that it shows how meaning parts relate to one another within words but also between words. Students construct matrices that allow them to explore word meaning.

			metr		
dia / tele			**measure**	ic	al / ly
tri	**gon**	o			s
psych				o	**nome**
bi / is					
a	sym				y

word webbing
"symmetrical"

Now Let's Look at the Prefix

Now, we can take a look at the prefix. Any good dictionary will let you know that sym, a relatively common prefix of Greek origin, means "together, same." It shares meaning with its sister prefixes, syl and syn.
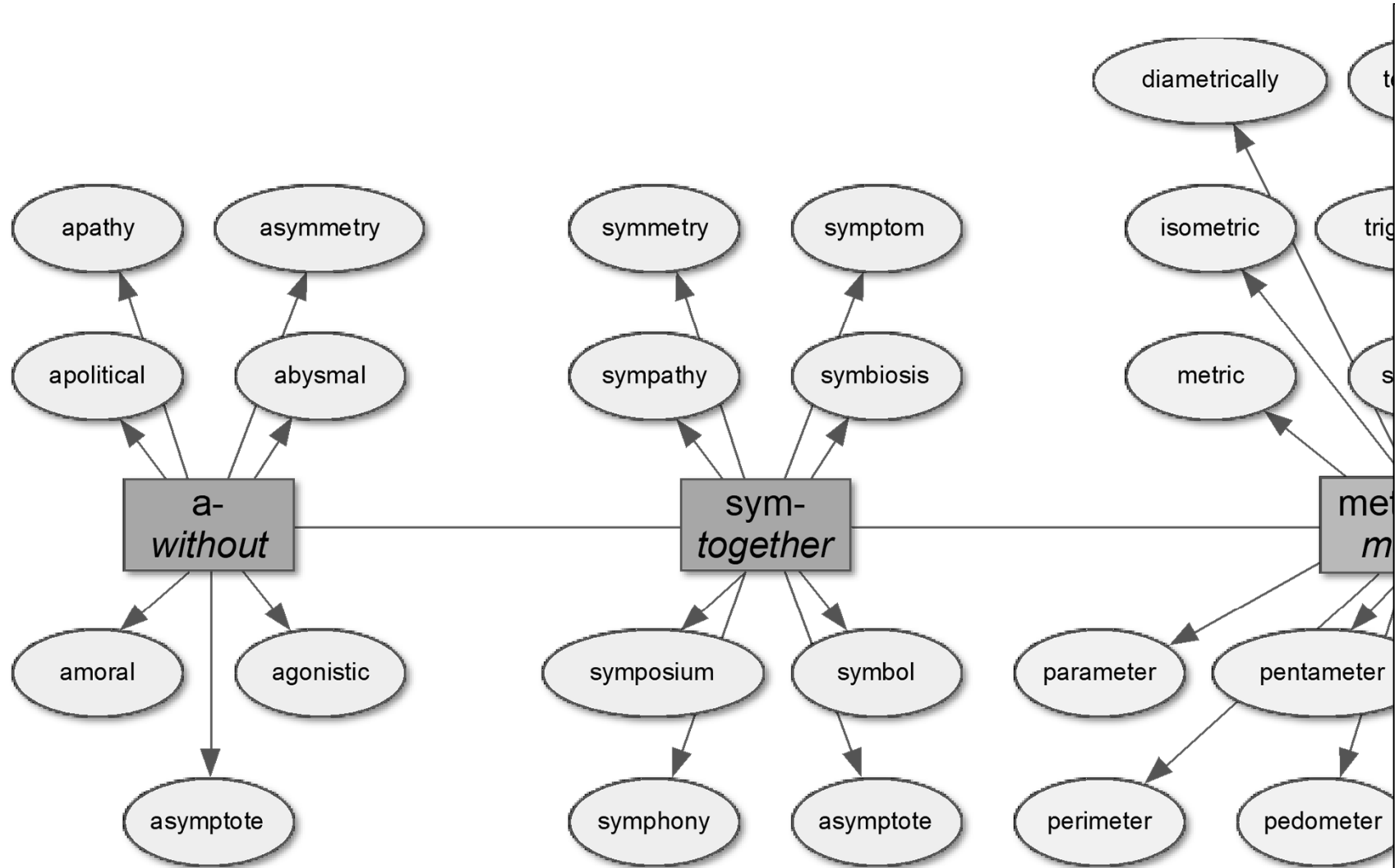
sym	metr	ic	al
prefix	bound base	suffix	suffix

This is readily apparent in words like synonym (same name) and syllable (literally sounds together). You can explore this tangent at your whim with students, who will find many rich parallels in sym, syl, and syn. For our purposes today, though, let's just look at sym.

Sym words

Leading students to investigate other sym- words, such as sympathy, symptom, and symposium and then to explore how their meanings relate to "together or same" provides a rich vocabulary-linked lesson.

Then, you might want to consider what asymmetrical means. That a-, meaning without or not, is in a lot of words, most of Greek origin. We have atypical, apathy, agnostic, amoral, apolitical, and so on. While you might not want to explore that during your lesson on symmetrical, certainly it might bear investigation at a later date.

apathy asymmetry

symmetry symptom

diametrically t...

apolitical abysmal

sympathy symbiosis

isometric trig...

metric s...

a-
without

sym-
together

met...
m...

amoral agonistic

symposium symbol

parameter pentameter

asymptote

symphony asymptote

perimeter pedometer

A final word from Louisa Moats…

"Orthographic patterns are internalized through exposure to multiple examples, opportunities to sort and compare words, and explicit instruction in the most dependable patterns."
(Moats, 2020, 116)

Application Activities

Morphology isn't an isolated study. It needs to be taught using best practices for teaching spelling and vocabulary, it needs to be taught using a problem-solving approach where students are asked good questions and asked to investigate, and it needs to be taught in application.

- Don't give them a matrix. Give them a base and have them generate words and create a matrix of their own.
- Don't give them a web of morphologically related words—lead them to create it.
- Don't give them a meaning to memorize--help them uncover it on their own and help them see how it relates to other words that contain the studied morpheme.
- Build application through having students read sentences and passages containing the word or morpheme you're studying. Have them generate sentences of their own using words containing the morpheme as well.
- The curiosity you develop in students will apply to their future word investigations, even when you aren't involved in the process.

Putting Your Fears to Rest

Perhaps one of the best things about morphological study is that you don't have to be or act like the expert. This is about exploring words *with* students, helping them uncover meanings and deepen their understanding, and, in doing so, helping them develop word sense to explore words on their own. It's a win-win for everyone, and it will make students better readers, writers, and thinkers.

I hope you've enjoyed this segment and encourage you to take advantage of the concepts we've discussed to work with students in the area of deep, research-based vocabulary instruction—to build better readers, writers, and thinkers!