What a Difference a Morpheme Can Make!!!
Words with Spelling Connections Have Meaning Connections

Nancy Cushen White, Ed.D.

What a Difference a Morpheme Can Make!

WORDS WITH SPELLING CONNECTIONS
HAVE MEANING CONNECTIONS.

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The Tri-Counties Branch of
The International Dyslexia Association

www.slingerland.org
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English Orthography—David Crystal—2012

Ultimate Test of the Validity of a Spelling Principle:
"We use it to predict the spelling of words as yet unborn."

"The underlying system is robust and regular, but struggles to be visible through the layers of orthographic practice introduced over the centuries by writers with different linguistic, cultural, and political backgrounds."

"… the best way of defeating an enemy is to get to understand him."

- Spelling is a linguistic problem that must be solved using linguistic tools.

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Orthography
Etymology + Morphology + Phonology

- Etymology → *interrelationships* of words with their own *origins* and with other words that share those origins—through *history*
- Morphology → sequence and structure of *meaningful units*—in English *today*
- Phonology → units of *speech* that create meaning only when combined

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ROOT—Base Element—Stem

- Etymological → strictly historical term (diachronic)
- Etymological source of the base element

Root—**BASE ELEMENT**—Stem

- Essential *kernel* of a word's meaning
- No inherent historical reference—strictly structural
- Spelling of a word as it is today

Root—Base Element—**STEM**

- Base element that has already acquired another element [base or affix] AND to which a further affix or base element can be added:
  → *reject* [*-ion*] [*in-*] *active* [*ate*] *universe*+[*ity*]
- All stems are complex words, but not all complex words are stems.

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Roots-Base Elements-Stems

EXAMPLES OF ROOTS

- The root of *UGLY* is the Old Norse <uggligr> which means "to be feared."
- The root of *GREGARIOUS* is the Latin <gregem> which means "flock."

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Base Element → <grege>

Real Spelling *www.realspellers.org/gallery*

con ag e	**grege** *"flock"*	ate: s, ing, ed ion: al, s, ist
de, se		i: ous, ly ary: ous, ness ant

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ROOTS-Base Elements-Stems

Eponym ➔ a word derived from the name of a person

- <*cereal*> ➔ *Ceres, goddess of grain*
- <*atlas*> ➔ **Atlas** *was a 2nd-generation Titan who personified the quality of endurance. He led the Titans in a rebellion against Zeus and was condemned to bear the heavens upon his shoulders. Illustrations on covers of early books of maps showed* **Atlas** *holding up the globe; today, a book of maps is called an* **atlas.**
- <*sandwich*> ➔ **The Earl of Sandwich** *was a compulsive gambler—who did not want to stop gambling when he was hungry.*

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ROOTS-Base Elements-Stems

Toponym ➔ a word derived from the name of a place

- <*cologne*> ➔ **perfume—originating from Cologne, Germany**
- <*fez*> ➔ **cylindrical red headgear with a tassel—named after the Moroccan city of Fez**
- <*meander*> ➔ **bend in a river—named after Meander, a river in Turkey**
- <*Rubicon*> ➔ **point of no return—named for Rubicon (or Rubico), a small former river in northern Italy**
- <*Siberia*> ➔ **remote undesirable location—named for Siberia, in eastern Russia**

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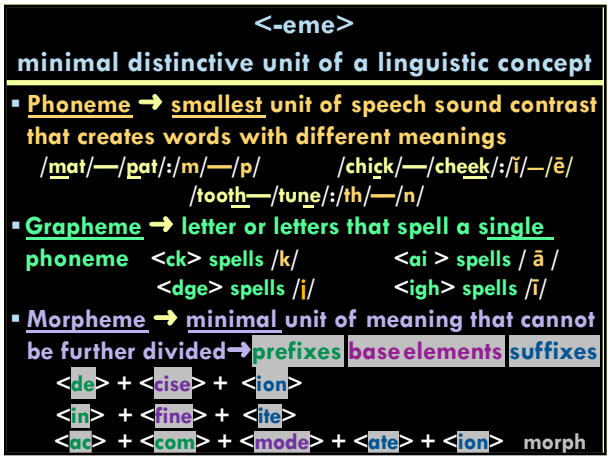

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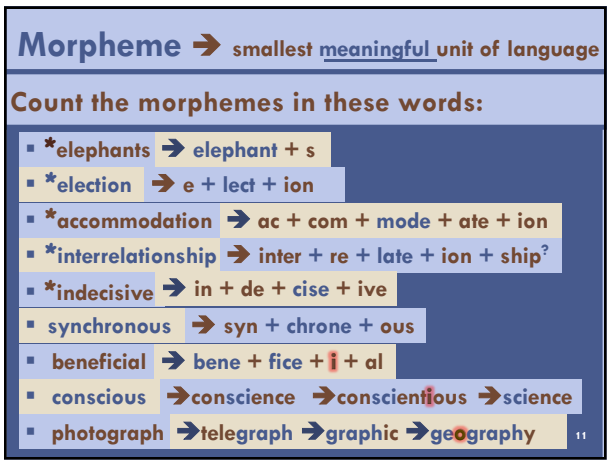

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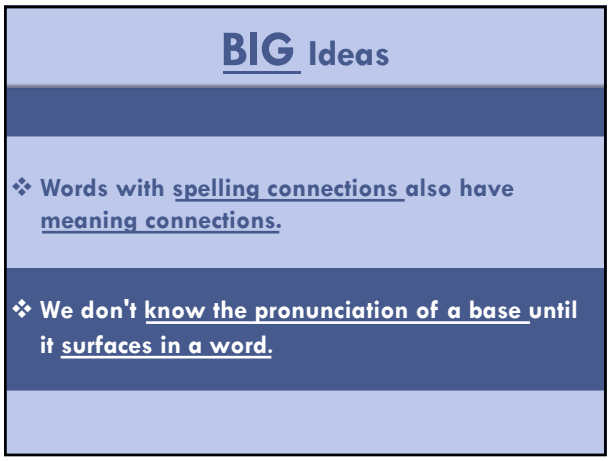

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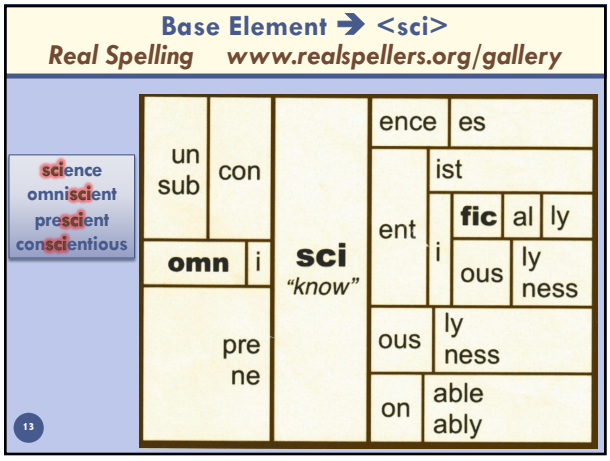

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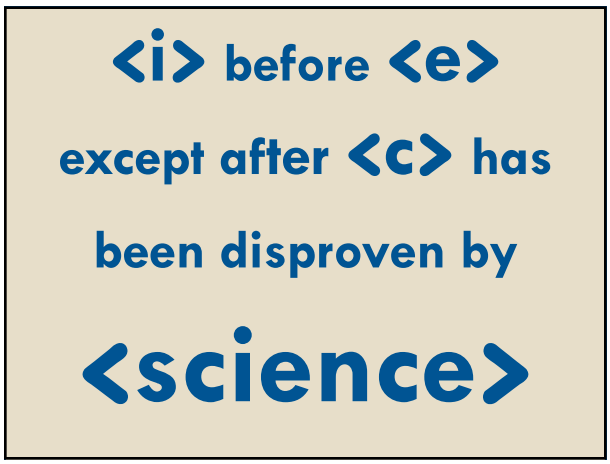

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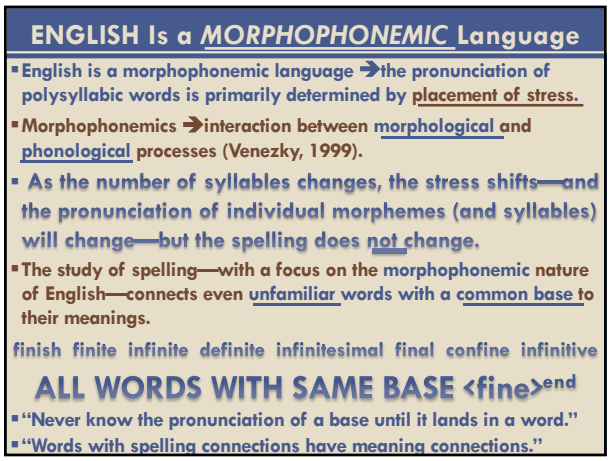

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Morphophonemics

*invent	invention
*electric	electrician
*inspiration	inspire
*definite	define finite
specific	species special
grammar	grammarian
politics	political
mathematician	mathematics
rhetoric	rhetorical

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Morphology

Morpheme → smallest unit of meaning
➢ Linguistic Entity → whole word → part of a word → single phoneme

*accept	except
elicit	illicit
affect	effect
fiscal *1560s, "pertaining to public revenue," etymological notion: "public purse"—taxes	physical
specific	pacific
conscious	conscience
*dentist	swiftest
hostess	famous

spectroheliograph *instrument for taking photographs of the sun in light of one wavelength only

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Bruner's Law

"We want kids to experience success and failure as *information*—*not* success or failure."

—Jerome Bruner

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Another BIG Idea

- Words with spelling connections also have meaning connections.
- We don't know the pronunciation of a base until it surfaces in a word.
- The meanings of specific words need to be taught in ways that support students in understanding how words are connected semantically and morphologically (Graves, Juel, & Graves, 2004).

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Denotation and Connotation NOT THE SAME

- BOTH Denotation AND Connotation must be considered, but they are NOT THE SAME.
- Denotation ➔ refers to *literal, primary* meaning
- Connotation➔ refers to other characteristics *suggested* or *implied*
  - A word like <mother> *denotes* "a woman who is a parent" but *connotes* qualities such as protection and affection.

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Free Morphemes-Bases

- Can stand alone as words
- Do not need to be combined with other morphemes
- May have one or more syllables

FUNCTION WORDS	CONTENT WORDS
conjunctions	nouns
prepositions	verbs
pronouns	adjectives
auxiliary (helping) verbs	adverbs
articles	

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Function Words

- ❑ Difficult to define in isolation—without context
- ❑ Provide information about the function of content words
- ❑ Main concern of grammar books
- ❑ Usually UNstressed (unaccented)
- ❑ Few, if any, synonyms

Function Words

- conjunctions
- prepositions
- pronouns
- auxiliary [helping] verbs
- articles

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Connected Text
Unstressed Function Words

- Learning to read and write words is a process of increasing awareness and coordination of three different types of word forms.
- Compounds are characterized more by their stress pattern than by their spellings.
- With one etymological concept—the homophone principle—we can drop the false assumption that homophones are confusing because they are spelled differently.

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Content [Lexical] Words

- ❑ Denotation—specific meanings/definitions—and multiple synonyms
- ❑ Can be defined in isolation
- ❑ Principal concern of dictionaries
- ❑ Usually stressed [accented]

Content-Lexical Words

- nouns
- verbs
- adjectives
- adverbs

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Lexical [Content] Words Must Have At Least Three Letters

odd egg err ebb

When a lexical [content] word and a function word are homophones, one more letter is used to spell the lexical word.

in	for	by	to	or	but	be	we
inn	fore	bye	too	ore	butt	bee	wee
		buy		oar			

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Lexical [Content] Words Must Have At Least Three Letters

✧ What about one-syllable words ending in the phoneme /ī/?

<cry> <dry> <try> <sly> <pry> <shy>

These words can be spelled with a <y> grapheme to represent their /ī/ phoneme because their spelling includes a consonant blend or consonant digraph thus providing the 3 letters required for a lexical word.

<lie> <die> <vie> <tie>

These words cannot be spelled with the single letter <y> grapheme to represent their /ī/ phoneme because they begin with a single consonant grapheme and therefore need an additional letter to meet the minimum of three letters required for a lexical word—so <ie> must spell /ī/.

26 *Thanks to Gina Cooke for her insights on use of graphemes <y> and <ie> to spell /ī/.*

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Affixes ➔ Prefixes and Suffixes

- Affixes ➔ bound morphemes that generate derivations and inflections of a base element
  - Prefixes
    - ✧ Prefixes precede base elements within words.
    - ✧ A single base element may have multiple prefixes.
  - Suffixes
    - ✧ Suffixes follow base elements within words.
    - ✧ A single base element may have multiple suffixes.

Although there are only about 50 suffixes used in everyday English, suffixes appear in 50% of English words (David Crystal, 2012).

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Connecting Vowel Letter

It connects; it's a vowel; it's ONE vowel letter.

- A connecting vowel letter follows a base element.
- Only one connecting vowel letter may follow a base element.
  - -synonym = syn + onym
  - Latin—Default connecting vowel letter: <i>
    - -proficient = pro + fice + i + ent
    - Sometimes <u>:
    - -situation = site + u + ate + ion
  - Greek —Default connecting vowel letter in Greek: <o>
    - -thermometer = therm + o + meter
    - -psychology = psych + o + loge + y
  - Old English—ONLY occasionally <e>
    - -righteous = right + e + ous
    - -courteous = court + e + ous

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Base Elements

Free Bases—Bound Bases
Twin (Alternant) Bases

- Free Bases can function as single words independently.

will the text she with run warm

- Bound Bases are only words in combination with at least one other element.

sponse ject rupt chrone phys fer tain sci

- Twin Bases have alternant forms.

vide-vise scribe-script flex-flect duce-duct

  - Any or all may appear in the same word family:

same base—different spellings

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The meaning of the word is the sum of its parts.

How many words can you think of that share these Latin base elements?

mobe-mote-move
- ↗ same etymological family
- ↘ different morphological families

text

fide

*crede

*duce-duct twin bases—alternant spellings—same base

fer twin base?

sponse-spond twin bases—alternant spellings—same base

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The meaning of the word is the sum of its parts.
How many words can you think of that share these Latin base elements?

mobe-mote-move ↗ *same etymological family* ↘ *different morphological family*
mobility→emotion→moveable

text^weave →textile→context→texture→textual
fide^trust→confident→diffident→fidelity→fiduciary
crede^believe→accredit→incredible→credential
fer^bring-bear→reference→referral→prefer→different

duce-duct *twin bases*→introduce→introduction
sponse-spond *twin bases*→respond→responsive

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ORTHOGRAPHIC CHANGES WHEN ADDING SUFFIXES
SPELLING CONVENTIONS

1-1-1 OR DOUBLING RULE
win ➡ winning refer ➡ referral grab ➡ grabbing

SILENT e OR DROP RULE
give➡giving escape➡escapee response➡responsive
confide➡confident promote➡promotion gene➡genius

BOUND BASES: stere➡sterile fine➡finite pune➡punish

Y OR CHANGE RULE
penny ➡ pennies fury ➡ furious stingy ➡ stingiest

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Base Element ➔ <ter>
Real Spelling www.realspellers.org/gallery

de	**ter** *"frighten"*	ible, ibly i: **fy** + ed, es, ing **fic** + al, ly or: s, ist, ism ize *or* ise + es, ed, ing s, ed, ing, ent, ence

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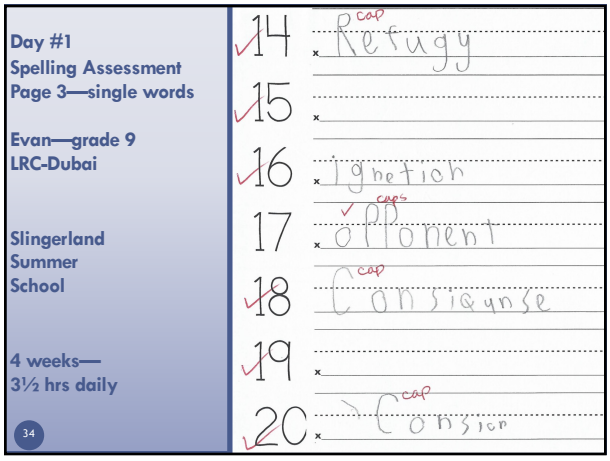

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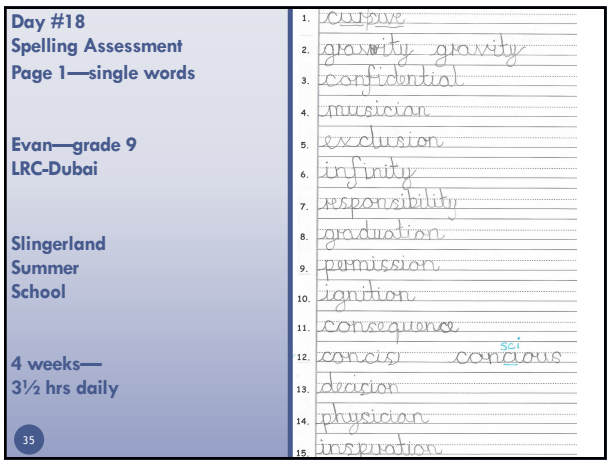

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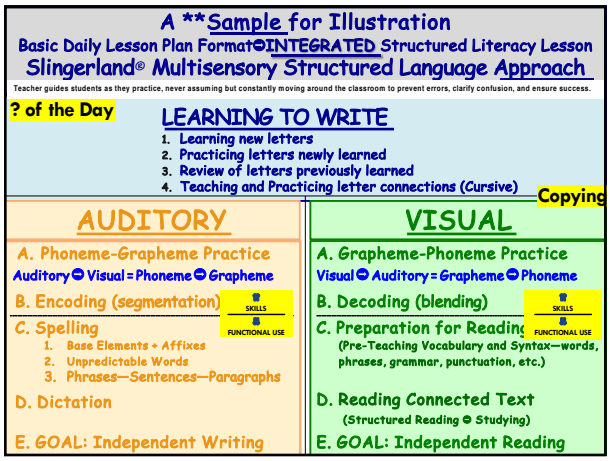

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Two Types of Suffixes: Inflectional and Derivational

Inflections and derivational morphemes are two kinds of morpheme units that operate differently in word formation.

- INFLECTIONAL SUFFIXES do not change the part of speech of the word to which they are added. The word continues to be a noun, verb, or adjective—even with the inflection.
- DERIVATIONAL SUFFIXES usually, but not always, change the part of speech of the word to which they are added.

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Consonant Phoneme // Changes

Consonant phonemes change in pronunciation from one form of a word to another:

- bomb ➡ bombard ➡ bombardier
- *crumb ➡ crumble** ➡ <crumb> + <_le>
- malign ➡ malignant*
- *sign ➡ signature ➡ signify ➡ signal
- anxious ➡ anxiety
- medic ➡ medicine
- definite ➡ definition
- repress ➡ repression

**<-le> is *sometimes* a suffix ➡ diminutive
sparkle crackle twinkle

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How We Remember Words

- Related words are activated in memory when they have meaningful connections and share structural elements at the morpheme level, especially when spelling reveals those connections (Nagy et al, 1989)—even when pronunciation does not:

<fine> = to end; limit; set a boundary

define ➡ finish ➡ finite ➡ infinite ➡ definite ➡ infinity ➡ final ➡ finalize ➡ finality ➡ indefinable ➡ infinitesimal ➡ confine ➡ confinement ➡ infinitive

- Awareness of morphemes aids understanding and recall of differences among homophones:

sci➡ conscious cise➡ decision
sponse➡ response panse➡ expansion

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How We Remember Words

- We know from cognitive experimental research that people with morphological awareness organize their **mental dictionaries** so that related words are associated and more readily retrieved (Schreuder & Baayen, 1995).
- ... the mind is always seeking **pattern recognition** to reduce the load on memory and facilitate retrieval of linguistic information:

auditory➡auditorium➡audit➡audition➡audience
<aud>
inscribe➡subscription➡scribe➡describe➡script➡ascribable
<scribe> <script>

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More Morphophonemics Pronunciation Changes

- English is a morphophonemic language.
- Morphophonemics➡ interaction between morphological and phonological processes (Venezky, 1999).
  - Pronunciation of polysyllabic words ➡ determined by placement of stress.
  - Pronunciation (phonological) changes in morphemes occur when morphemes combine to form different words
    - As # of syllables changes, stress shifts—and pronunciation of individual morphemes will change.
    - Words with spelling connections have meaning connections.
    - The study of spelling—with a focus on the morphophonemic nature of English—connects even unfamiliar words with a common base to their meanings.

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Triple Word Form Theory
Phonology—Orthography—Morphology
(Berninger et al., 2003)

- Learning to read and write words is a process of increasing awareness and coordination (integration) of three different types of word forms and their parts:
  - Phonology ➜ speech sounds-phonemes
  - Orthography➜ graphemes that spell phonemes
  - Morphology➜ morphemes—meaningful units

[spelled with the same 250+/- graphemes representing 44+/- phonemes-speech sounds]

- Multidisciplinary evidence for triple word form theory continues to accumulate.

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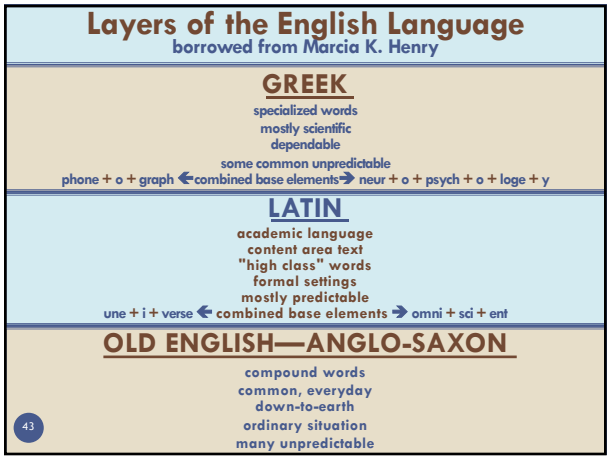
Layers of the English Language
borrowed from Marcia K. Henry
GREEK
specialized words
mostly scientific
dependable
some common unpredictable
phone + o + graph ← combined base elements → neur + o + psych + o + loge + y
LATIN
academic language
content area text
"high class" words
formal settings
mostly predictable
une + i + verse ← combined base elements → omni + sci + ent
OLD ENGLISH—ANGLO-SAXON
compound words
common, everyday
down-to-earth
ordinary situation
many unpredictable
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Old English Layer
▪ Compounds are characterized more by their stress pattern than by their spellings.
▪ Stress, or accent, almost always occurs on the first word of the compound.
▪ The compound has a meaning that isn't *coextensive [does not correspond exactly] with the sum of the meanings of its components: <greenhouse>
▪ Spelling may include a hyphen or a space.
earthquake cupcake two-way credit card
Classes of Compound Words:
➢Closed → shakedown baseball bookkeeper
➢Hyphenated → open-ended
➢Open → nervous breakdown
*coextensive: extending over the same space or time; corresponds exactly

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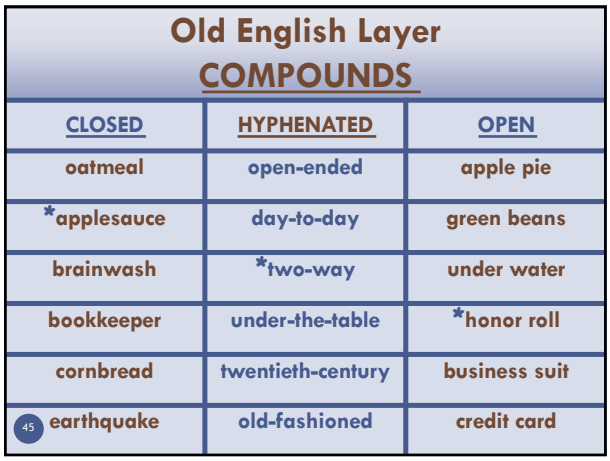
Old English Layer
COMPOUNDS
CLOSED
HYPHENATED
OPEN
oatmeal
open-ended
apple pie
*applesauce
day-to-day
green beans
brainwash
*two-way
under water
bookkeeper
under-the-table
*honor roll
cornbread
twentieth-century
business suit
earthquake
old-fashioned
credit card
45

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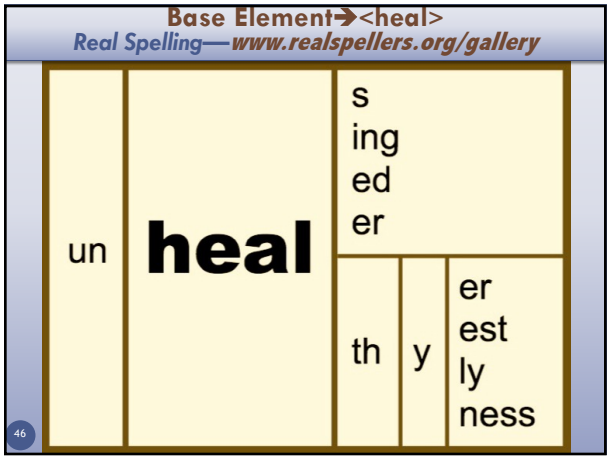

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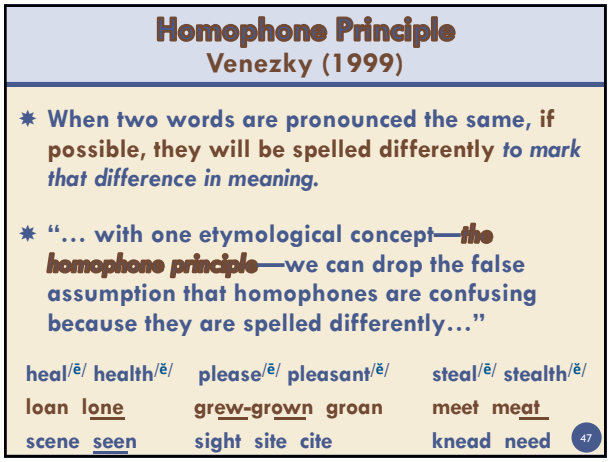

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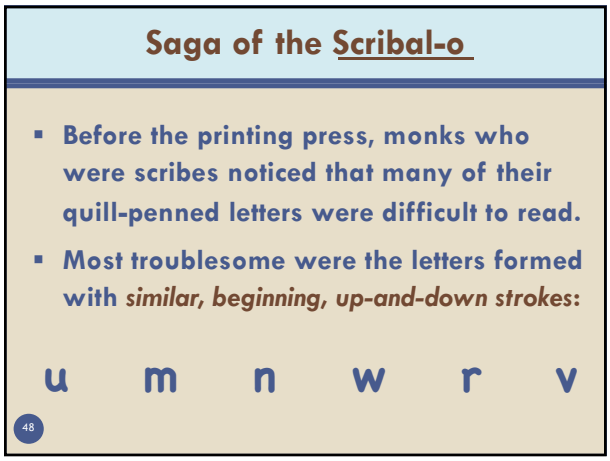

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Saga of the Scribal-o

- Therefore, the wise scribes changed the vowel grapheme <u> to o when <u> appeared adjacent to one of the letters listed.
- The scribes could not, however, alter the pronunciation of the words that were affected by the spelling change they made.
- Therefore, the grapheme o in words like, *brother, love, some,* and *wonder,* is pronounced /ŭ/.
  - What about *month* and *Monday*?

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Adapted from Carol Murray

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Think of a word that ends in v…

- have
- starve
- love
- strive
- nerve
- give
- twelve
- grieve
- live
- believe
- move
- arrive
- heave
- relative
- motive
- beehive
- authoritative
- attractive

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Why don't English words end in <v>?

- The letter <u> shares history and behavior with <v> and has a spelling partnership with <o>.
- The letters <u> and <v> used to be written—and printed—identically—something like <v>.
- The early printers did develop two versions of the letter—<v> and <u>—but choice between them was determined ONLY by their position in the word, not whether they were functioning as the vowel or the consonant letter.
- When vowel <u> or consonant <v> appeared at the beginning of a word, it was written <v> but when either occurred inside a word it was written <u>:

haue loue euery vpon ouer liue vse

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Spelling /r/ with wr…

- Usually one syllable
- Meaning associated with "twisting"

wring	wreath	wrestle	wrangle	write
wrath	wrinkle	wrong	wrench	wrist

- What about <wren>?

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Words that begin with *tw*…

- Meaning associated with "two"

twins	twine	twinkle
tweezers	twelve	twenty
betwixt		between

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Etymological Marker?
Venezky 1999

- The <w> in <two> is not there as a grapheme representing a phoneme. It is there to inform readers that <two> is the *spelling for the number*.
- … so there is sense to the <o> in <people> when we consider words like <*popular*> and <*population*> —*from* the *same etymological family*.
- … and what about the <l> in <yolk>? Could it be from the *same etymological family as* <*yellow*>?

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Why does <ey> spell /ā/ in <they>?

they
them
their *[y changed to i inside a word]*

55

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Why is there an <l> in <would>?

will → would

shall → should

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...so what about the <l> in <could>?

ANALOGY

- Words that sound similar tend to be spelled the same. This process of analogy affected many new words as they arrived in English–and some older spellings were changed to conform. (p. 121, Crystal, 2012).
- Throughout the history of English spelling, even in tiny groups of words (e.g., auxiliary verbs *would-should-could*), analogy has had influence.
  - +Though they all look the same now, there was no <l> in <could> originally.
  - +The other two verbs both had an <l>: *wolde-sholde*.
  - +When <*wolde*> and <*sholde*> became <*would*> and <*should*> in late Middle English, scribes decided there should also be an <l> in <*could*>.

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Is the spelling of <does> unpredictable?

do	does	doing	done
go	goes	going	gone

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Is the spelling of <does> unpredictable?

*do	does	doing	done
*go	goes	going	gone

The spelling of <does> is predictable, but the pronunciation is not.

**lexical words with only two letters*

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Vocabulary Growth from 3rd Grade Onward

- Vocabulary knowledge grows rapidly after 3rd grade, but only if the student understands derivational suffixes (Anglin, 1993; Berninger, Abbott, Nagy & Carlisle, 2010). For the average 5th grader, derivations account for the lion's share of known words.
- Adolescents who do not understand how derivations are structured are likely to struggle with reading, vocabulary and comprehension (Berninger et al., 2010; Nagy, 2007; Nagy, Berninger, & Abbott, 2006). These students need explicit morphology instruction.
- Generating morphological families is a lot like solving a puzzle.
  - Deductive thinking allows students to play detective—sleuthing out unforeseen relationships between words.
  - Relationships between phonology, morphology, orthography, syntax, and semantics can become more transparent within a morphological family.
  - The teacher's task is to help students see how sounds, spellings, morphemes, meanings, and syntax are coordinated in a word.

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Latin Layer

Derivational ➔ Word-Building

- **Words derived from Latin roots/base elements are most common in content area textbooks.
- Analysis of the number of distinct words in printed school English showed that students encountered over 88,000 "distinct" words in texts through ninth grade (Nagy and Anderson, 1984).
- About half the words in printed texts through ninth grade occur once in a billion words of text or less (e.g., *inflate, extinguish, nettle*).

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Latin Layer
Morphological Awareness

- **For every word a student learns, there are usually between one and three related words that should be understandable.
- **There are degrees of semantic transparency in words
  - Apparent: *red* ➔ *redness*
  - Less Apparent: *apply* ➔ *appliance*
  - Least Apparent: *science* ➔ *conscientious*
- **The less morphological awareness a student has, the more distinct words need to be learned.
- Semantically transparent words are skewed toward the low end of the frequency distribution to a greater degree than morphologically basic words or semantically opaque words (Nagy and Anderson 1984).
- About 60% of the unfamiliar words encountered in the middle school years and beyond are sufficiently transparent—even though they are morphologically complex in structure and meaning—that a reader might be able to infer the meaning of the word (Nagy et al., 1989).

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Romance Layer

How many words can you think of that share these Latin base elements: <*secute-seque*> *[to follow]* ?

<secute>	<seque>

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Romance Layer

How many words can you think of that share these Latin base elements: <*secute-seque*> *[to follow]* ?

<secute>	<seque>
prosecutor	sequence
consecutively	consequential
persecute	sequential
prosecution	sequester
persecution	subsequent

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Romance Layer

How many words can you think of that share these Latin base elements: <*grade-gress*> *[to step]* ?

<grade>	<gress>

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Romance Layer

How many words can you think of that share these Latin base elements: <*grade-gress*> *[to step]* ?

<grade>	<gress>
gradient	progress
graduate	digress
degrade	aggressive
gradual	regress
biodegradable	congressional

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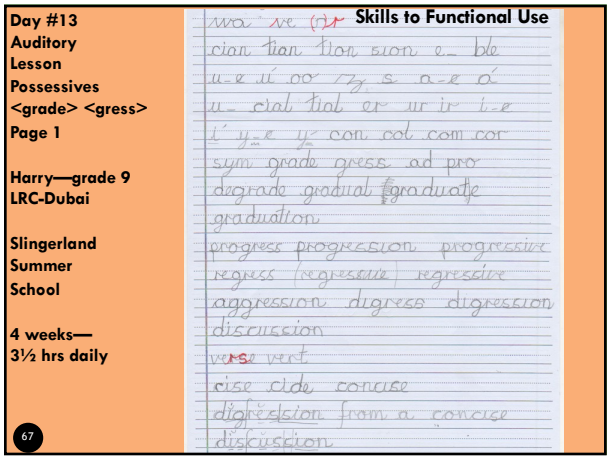

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Romance Layer

How many words can you think of that share these Latin base elements: <pel-pulse> [to push] ?

<pel>	<pulse>
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Romance Layer

How many words can you think of that share these Latin base elements: <pel-pulse> [to push] ?

<pel>	<pulse>
compel	repulsion
repellent	compulsive
propeller	pulsate
expelled	impulse
69 dispel	compulsory

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Romance Layer	
How many words can you think of that share these Latin base elements: <*pense-pend*> *[to hang]* ?	
<pense> <(s)pense>	<(s)pend> <pend>
pensive	pendant
suspense	appendage
propensity	suspenders
pension	dependent
dispense	pendulum

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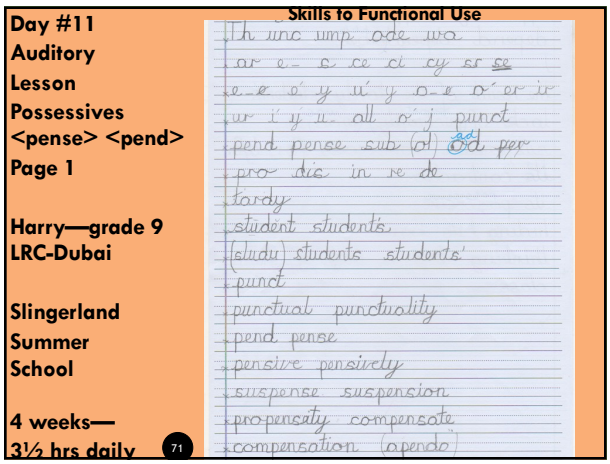

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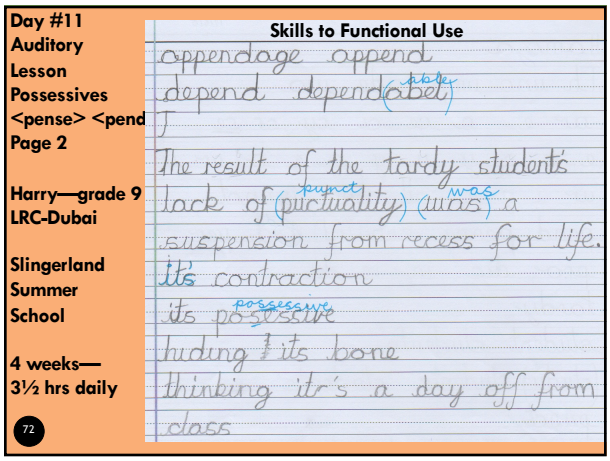

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Romance Layer

How many words can you think of that share these Latin base elements: *mit-miss [to send]* ?

mit	miss
commit	mission
committee	emissary
transmitted	remission
permit	permissive
emit	emission

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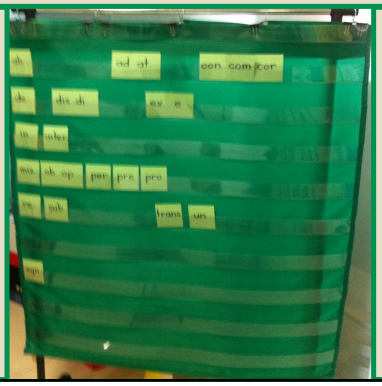
PREFIXES



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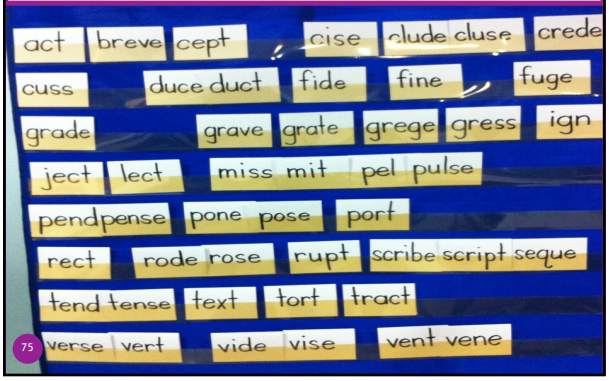
BASE ELEMENTS



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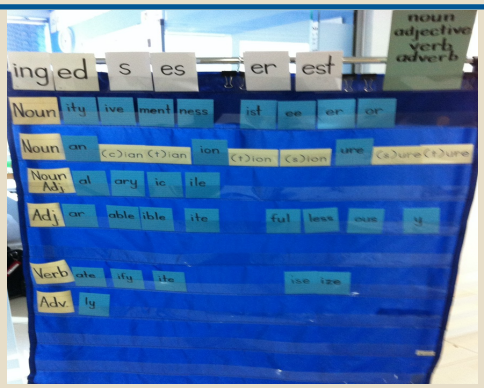
SUFFIXES



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Greek Layer

- Scientific and mathematical terms incorporated into English in the past 500 years have most often been constructed from Greek morphemes.
- Many Greek-derived morphemes combine with other bound morphemes of equal importance in flexible order:

geography	photosynthesis
psychology	phil·anthropic
chronic	synonym

*Prefixes (including assimilated prefixes)
*Base Elements
*Suffixes

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Base Element → <myst>
Real Spelling *www.realspellers.org/gallery*

de	**myst** "hidden, secret"	ery	es	
			ous	ly
		ic	al	ly
			ism	
		i	**fy**	es
				ed
				ing
			fic	ate ion
		ique		

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Effects of Morphological Awareness

- Phonological awareness facilitates morphological awareness in younger children (Carlisle & Nomanbhoy, 1993), and both are associated with stronger reading skills.
- **Problems that poor readers have with applying morphological rules to unfamiliar base words are attributable in large part to more basic weaknesses in phonological processing (Carlisle, 1987, 1988; Fowler & Liberman, 1995).**
- Because morphemes are units of both sound and meaning, deficits in phonological processing contribute to confusion of similar-sounding words and word parts, failure to recognize similarities of structure, and failure to either store or retrieve word form with precision.

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Effects of Morphological Awareness

- **Better readers with excellent language abilities in fourth through eighth grade are able to talk about word structure and word meaning in a precise, decontextualized manner that reveals conscious knowledge of phonology and morphology (Snow, 1990).**
- Adults who read poorly have less information in their mental dictionaries as well as less ability to organize and gain access to words using morphological relationships (Cunningham & Stanovich, 1997; Leong, 1989; Shankweiler et al., 1996).
- Adults who read accurately and fluently have accumulated wide networks of word families for ready access and cross-referencing in the lexicon (Nagy et al., 1989).

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Effects of Morphological Awareness

-Differences between good and poor spellers are associated with significant differences in sensitivity to word structure at the morphological level.

-Children with specific written language and spelling disorders have been shown to misuse, substitute, or omit inflected endings more than typical children (Bailet, 1990; Moats, 1996).

-Insensitivity to morphological aspects of word structure also characterizes adults who spell poorly.

(Fischer, Shankweiler, & Liberman, 1985; Liberman, Rubin, Duques, & Carlisle, 1985; Shankweiler et al., 1996; Berninger, Abbott, Nagy, & Carlisle, 2010; Kirby et al., 2012; Goodwin & Ahn, 2013)

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English Orthography—Joanne Carlisle—2003

- "As the reader proceeds through the grades, the reading material becomes less contrived and words become increasingly morphologically complex.
- Hence, the ability to recognize morphemes and derive meaning from polysyllabic words will become increasingly invaluable as readers progress through the grades.

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