Structured Word Inquiry:
Developing literacy by making sense of English spelling

“Unlocking Literacy: Effective Decoding & Spelling Instruction”

“Teachers who comprehend the origins of the English language along with the primary structural patterns within words can improve their assessment skills, enhance their understanding of reading and spelling curricula, communicate clearly about specific features of language, and effectively teach useful strategies to their students.”

Marcia Henry, (2010, p. 39)


Structured Word Inquiry:
Learning to read is learning how to use the conventional forms of printed language to obtain meaning from words... This view implies that the child learning how to read needs to learn how his or her writing system works [emphasis added]” (p. 34).
**Guides for Structured Word Inquiry**

**Guiding principles of Structured Word Inquiry**

Once teachers develop a basic understanding of English spelling and they begin to take on the structured inquiry approach (Bowers & Kirby, 2010), they should be able to identify how any instruction of the written word reinforces one, two or all of the following "big ideas."

1. English spelling is a highly ordered system for representing meaning that can be investigated and understood through scientific inquiry.

2. Scientific inquiry seeks the most elegant solution -- the deepest structure that accounts for the greatest number of cases. (See this example)

3. Analysis of word structure for meaning cues can be used to deepen understanding of concepts and terms in any subject area (Science example, Humanities example & video).

**Process of “Structured Word Inquiry”**

1) Catch learners with an interesting spelling question. (e.g., why <g> in <sign>?)

2) Strategically present a set of words that makes the relevant pattern more salient.

3) Help learners hypothesize a solution from carefully presented evidence.

4) Guide testing of learners’ hypotheses and identify the precise pattern.

5) Practice the identified pattern with appropriate tools (e.g., word sums, flow charts).

See more on structured word inquiry, and the difference between “teacher-led inquiry” and “inquiry-led teaching” at this link.
The Word Sum and the Matrix

The word sum is the basic linguistic tool for revealing the structure of any word. We need to learn how to write and spell out loud word sums with our students. Here one example:

![Word Sum Diagram]

Complete these word sums, by writing and spelling them out loud. Make sure to show any changes.

See a video modelling the instruction of word sums at this link:

http://www.youtube.com/user/WordWorksKingston#p/u/0/qoeyGZDstkI

un + help + ful → ________________  dis + cover + y + es → ________________

hope + ing → ________________  try + ing → ________________

hop + ing → ________________  try + es → ________________

carry + age → ________________  busy + body → ________________
Structured Word Inquiry: Developing literacy by making sense of English spelling

A Series of “Teacher-Led Inquiry” lessons sparked from the question “Why is there a <g> in <sign>?”

Taken from “Teaching How the Written Word Works” (Bowers, 2009)

Activity Sheet #1

Word Building: Using a Real Spelling Word Matrix

A WORD MATRIX USUALLY ONLY SHOWS SOME POSSIBLE WORDS, YOU CAN USUALLY FIND MORE IF YOU TRY!

Rules for reading a word matrix:
• Read a matrix from left to right
• Make only single, complete words from a matrix
• If you are unsure that a word you build is a real word, check a dictionary
• You don’t have to take an element from every column of a matrix – BUT
• You must not ‘leapfrog’ over a column
• WATCH THE JOINS – sometimes changes happen where you add a suffix

Build words with your cut out prefixes and suffixes on the base <sign>. Once you have built a word, write the word sum as modeled in 1 and 2.

Part A:

1) sign + al
   ➔ signal
2) as + sign + ment
   ➔ assignment
3) __________________
3) __________________
4) __________________
5) __________________
6) __________________
7) __________________
8) __________________
9) __________________
10) __________________

Lesson #2: Spelling Detectives

When does Suffixing Cause Changes at the Joins?

A) Investigation: Developing a hypothesis

Study the matrix for <move> and the word sums created from it to see if you can discover a consistent suffixing pattern.

Word Sums from <move> Matrix

(move + s ➔ moves
move + ing ➔ moving
move + ed ➔ moved
move + er ➔ mover
move + ment ➔ movement
re + move + ed ➔ removed
re + move + er ➔ remover
un + move + ed ➔ unmoved

1. What is the change that sometimes occurs at the suffix join?

2. List the suffixes that cause the change: _____  _____  _____

3. List the suffixes that cause no change: _____  _____

4. How are these suffixes different from each other?

5. Our class’ hypothesis to explain how you know which suffixes may force a change at the join:

Real Spelling Tool Box Connections
1K - Learning from Love (Learn about the letter <v>)
3A - Revisiting Suffixing (Learn many roles of the single, silent <e>)
Lesson #2 Continued…

B) Testing our Hypothesis:
These matrices build on base words (a one morpheme word - no prefix or suffix) that end with the letter 'e'.

- Create word sums from a variety of the matrices to test our class hypothesis. (You don’t need to build every possible word from each matrix to test the hypothesis.)
- Be ready to share interesting discoveries with the class. Any surprising findings, or words whose pronunciation changes when you add affixes?

<table>
<thead>
<tr>
<th>dis</th>
<th>please</th>
<th>ed</th>
<th>ant</th>
<th>ure</th>
</tr>
</thead>
<tbody>
<tr>
<td>agree</td>
<td></td>
<td>ing</td>
<td>ment</td>
<td>able</td>
</tr>
<tr>
<td>mis</td>
<td>be</td>
<td>have</td>
<td>i</td>
<td>OUR (Can) OF (US)</td>
</tr>
<tr>
<td>be</td>
<td></td>
<td></td>
<td>ing</td>
<td>ed</td>
</tr>
<tr>
<td>un</td>
<td>hope</td>
<td>s ing</td>
<td>ed</td>
<td>ful</td>
</tr>
<tr>
<td>re</td>
<td>take</td>
<td>s ing</td>
<td>en</td>
<td>out</td>
</tr>
<tr>
<td>en</td>
<td>large</td>
<td>es er</td>
<td>ing</td>
<td>ed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ly</td>
<td>lish</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ment</td>
<td>s</td>
<td></td>
</tr>
</tbody>
</table>


Activity #3

Flow Chart for Dropping the Single, Silent <e> During Suffixing

Instructions:
• On a separate page, rewrite the beginning of the word sum provided.
• Use the flow chart to identify the correct spelling when fixing the suffix to the base.
• When a silent <e> is replaced by a vowel suffix, cross it out on the left or the “rewrite arrow” before competing the spelling on the left side of the arrow.

Example: date + ing → dating

Word Sums
1. cave + ed → 11. laze + y →
2. create + or → 12. rule + er →
3. require + ment → 13. imagine + ary →
4. smile + ing → 14. pure + ly →
5. rude + ly → 15. please + ure →
6. brave + est → 16. operate + ion →
7. brave + ly → 17. smile + s →
8. include + ing → 18. amaze + es →
9. lone + ly → 19. amaze + ment →
10. close + ness → 20. ice + y →
Steps for constructing word sums that include marking and announcing of dropped single, silent <e> s

Step #1: Build left side of word sum.

This written word sum...

please + ure →

...is written and spelled aloud in groups like this: p-l-e-a-s-e-- "plus"--ure "is rewritten as"

Step #2: Say “Check the joins!” and mark changes on left side of word sum.

a) Note that <ure> is a vowel suffix that replaces the final, single, silent <e> of <please>.
b) Draw a line through that silent <e> to remind yourself to announce that change when you complete the right side of the word sum.

please + ure →

Step #3: Complete right side of word sum, announcing the structure you have represented on left side of word sum.

Spell and write out the result...

please + ure → pleasure

...in groups like this:

p-l-e-a-s-e-- "no <e>"-- "pause"-- ure

Steps for constructing a word sum that includes marking and announcing double letters

Step #1: Build left side of word sum.

This written word sum...

com + mit + ee →

...is written and spelled aloud in groups like this: com-- "plus"--m-i-t-- "plus"-- "double e"-- "is rewritten as"

Step #2: Say “Check the joins!” and mark changes on left side of word sum.

a) Note that the <ee> vowel suffix forces the doubling of the final single <t> (See big suffix checker for conventions.)
b) Mark a doubled <t>.

com + mit(t) + ee →

Step #3: Complete right side of word sum by announcing the structure you have represented on left side of word sum.

Spell and write out the result...

com + mit(t) + ee → committee

...in groups like this:

com-- "pause"--m-i-t-- "double t"-- "pause"-- "double e"

- If the same letter occurs twice in a row within a morpheme, or if it is doubled because of a suffixing change, it is announced as a “double letter” in a word sum.
- If there is a plus sign between a letter that is repeated twice in a row it is an “accidental juxtaposition” not a double letter. There are two <m>s in <committee> but there is no “double m”. There is a “double t” and a “double e”.

For suffixing conventions see Big Suffix Checker and/or Interactive Suffix Checker
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The Orthographic Word Sum

The word sum is the basic linguistic tool for revealing the underlying structure of any word. Complete these word sums, by writing and spelling them out loud. Make sure to show any changes. Note that in the “Analytic Word Sums” the user sometimes has to identify if the starter word is a base, or if it is complex. Find more on this practice [here](#), and a video modelling the instruction of word sums at this [link](#).

### Synthetic Word Sums

<table>
<thead>
<tr>
<th>Substructure</th>
<th>Surface Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>spring</td>
<td>spring</td>
</tr>
<tr>
<td>care + ful + ly</td>
<td>spell + ing</td>
</tr>
<tr>
<td>cute + er</td>
<td>cut + er</td>
</tr>
<tr>
<td>act + ive + ity + es</td>
<td>marry + ing</td>
</tr>
<tr>
<td>marry + es</td>
<td>sky + dive + ing</td>
</tr>
<tr>
<td>sky + dive + ing</td>
<td>carry + age + es</td>
</tr>
<tr>
<td>un + heal + th + y + ly</td>
<td>nate + ure + al + ly</td>
</tr>
</tbody>
</table>

### Analytic Word Sums

<table>
<thead>
<tr>
<th>Surface Structure</th>
<th>Substructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>alone</td>
<td>alone</td>
</tr>
<tr>
<td>does</td>
<td>does</td>
</tr>
<tr>
<td>disease</td>
<td>disease</td>
</tr>
<tr>
<td>spelling</td>
<td>spelling</td>
</tr>
<tr>
<td>duckling</td>
<td>duckling</td>
</tr>
<tr>
<td>rightfully</td>
<td>rightfully</td>
</tr>
<tr>
<td>bookkeeper</td>
<td>bookkeeper</td>
</tr>
<tr>
<td>assistance</td>
<td>assistance</td>
</tr>
<tr>
<td>sisterhood</td>
<td>sisterhood</td>
</tr>
<tr>
<td>disruptive</td>
<td>disruptive</td>
</tr>
</tbody>
</table>

**Steps for constructing a word sum that includes marking and announcing <y>/<e> changes**

1. **Build left side of word sum.**
   - **Substructure:** ease + y + ly
   - **Surface Structure:** spring

2. **Check the joins!**
   - Mark the <y> --> <e>
   - **Substructure:** ease + y + ly
   - **Surface Structure:** spring

3. **Mark the changes.**
   - **Substructure:** ease + y + ly
   - **Surface Structure:** spring

**Videos of teachers and students spelling out word structure with word sums and working with matrices.**

- *A Skype tutoring session* with a Grade 2 student with word sums and the matrix.

**Go to the WordWorks YouTube page for many videos of students and teachers spelling out word sums and working with matrices.**
From the Matrix to the Word Sum

A foundational part of structured word inquiry is testing connections of structure and meaning by learning to building word sums from matrices. All of these matrices are taken from the Real Spelling 70 Matrices Disk (www.realspelling.com). This resource allows you to copy and paste any of those matrices to build lessons in minutes. With a little practice, teachers and students soon start building their own matrices.

Rules for reading a word matrix:
- Read a matrix from left to right.
- Make only single, complete words from a matrix.
- Only build words you can use in a sentence.
- You don’t have to take an element from every column of a matrix – BUT...
- You must not ‘leapfrog’ over a column.
- WATCH THE JOINS! Sometimes changes happen where you add a suffix. (See the Real Spelling “Big Suffix Checker” Or Neil Ramsden’s “Interactive Suffix Checker.”)

Some Challenges
Write your word sums that come from these matrices on a separate page. Investigate the matrices to build word sums that...
- Produce compound words.
- Have suffixing changes.
- Force a change in the pronunciation of the base.
- Produce complex words that have ‘long vowel sounds’.

Some Questions
- Can you find a base with a digraph that can represent more then one phoneme?
- What base uses a trigraph?
- What base uses a <t> to represent /t/ in one derivation, but /ʃ/ in another derivation (the same phoneme commonly associated with the <sh> digraph).
- What questions challenges could you give your class from these matrices?
Investigate word meanings by investigating their spelling structure and history

Follow the traces of meaning marked by the “footprints” of spelling structure of the family of words built on the base <vestige>.

Learn about words from and with students

This matrix was constructed by a 12-year-old student named Thelonious and his tutor right here in San Francisco. It was produced as the result of an investigation of the word <investigate> with the help of a new tool called the Word Microscope. This image was from their post on Real Spellers. It was by reading that post that I first learned of the spelling-meaning link between <investigate> and <vestige>.

With the help of the matrix and word sums, elementary students can discover connections of meaning between words that few adults have made. This is just one piece of evidence that it is time to bring these reliable linguistic tools into English speaking classrooms everywhere.

Go here for the word sums Thelonious and his tutor created, and the discussion that grew on www.realspellers.org from this investigation. Download the Word Microscope here. (For now it only available on PC’s).

Follow in the footsteps of Thelonious.

Construct word sums from this matrix. The grapheme-phoneme diagram to the right clarifies the sift in pronunciations associated with the <g> grapheme in these words.

From the Oxford English Dictionary:

<vestige>:
ORIGIN early 16th cent.: from Latin investigat- ‘traced out,’ from the verb investigare, from in- ‘into’ + vestigare ‘track, trace out.’

<investigate>:
ORIGIN early 16th cent.: from Latin investigat- ‘traced out,’ from the verb investigare, from in- ‘into’ + vestigare ‘track, trace out.’
What is crazy -- the English spelling system, or our typical systems for teaching spelling?

Consider the frustration experienced by the student in this story. The teacher does the best his training allows as he tries to help his student deal with yet another “irregular” spelling. Imagine the consequences for learning when such experiences are repeated over and over.

“Know More Explosions”

Excerpt from a Grade 4 teacher’s email

My program is for junior students identified with behaviour problems, problems which make their full-time participation in “standard” classrooms problematic for everyone involved. Most of our students have ADHD identifications, often coincident with LDs and other difficulties, and virtually all of them read more than two grade levels lower than they should. In many instances, the students’ behaviour difficulties and their language deficits pose a chicken-and-egg question.

In a guided reading session I was doing with a burly and eager Grade 4 student reading at PM 9, the student pointed to the work “know” and asked what it said. Knowing my students, I prepared him for my answer with "OK, this is going to blow your mind, but . . . ." When I finished with "It says /no/," he didn’t miss a beat. He tore the book off the table and flung it across the room. And then he started: "It does not f*#!ing say ‘no!’ " - giving the whole class a language lesson as he tore a path toward the classroom door - "<k> says /k/ and <w> says /w/, so it does not say f*#!ing 'no' !"

How am I supposed to learn this sh*!t when the rules change? <k> f*#!ing says /k/!"

After the student de-escalated - and being told that <knight> says /night/ DIDN’T help, I promised him I’d find out why that word is pronounced as it is.

Robb

Cursing our crazy spelling system seems like a natural response to Robb’s story about the struggle to learn and teach reading and spelling in English. It would be so much easier if we just had a reliable, logical spelling system!

Ironically, it turns out that our spelling system does meet these exact criteria. Unfortunately this assertion seems absurd in light of the instruction most of us have received. It is important to recognize, however, that the common assumption of English spelling as an unreliable, exception-riddled system is a hypothesis that can be tested.

The science of spelling: Scientific inquiry of the conventions of English spelling provides plenty of evidence that our spelling system is an extremely reliable and ordered system for representing the meaning of words to English speakers. (e.g. Carol Chomsky, 1970).

There is obviously much more to spelling than morphology. However, scientific analysis of English spelling makes it clear that we cannot make sense of our spelling system without morphological understanding.

Orthographic morphology is the conventional system by which spoken morphemes are written. Instruction can direct the attention of learners to this concrete representation of the meaning structure of words. Students can use morphological knowledge gained through instruction to define words they were not taught, but which are morphologically related to words that they were taught. (Bowers & Kirby, 2010). However, teaching morphology is not only about showing learners how bases and affixes can be used to learn new vocabulary.
Research has long emphasized the importance of letter-sound knowledge for literacy development (e.g., Rayner et al., 2001). The interrelated nature of morphology and phonology in English means that we cannot fully understand letter-sound correspondences without understanding the role of morphology.

It makes sense that learning letter-sound correspondences would be facilitated by a fuller understanding of how they operate. As linguist Richard Venezky pointed out long ago, "the simple fact is that the present orthography system is not merely a letter-to-sound system riddled with imperfections, but, instead, a more complex and more regular relationship wherein phoneme and morpheme share leading roles" (Venezky, 1967, p. 77).

**A spelling test of spelling instruction**

All of the words below have spellings that conform perfectly with the conventions of English spelling that linguists Richard Venezky, Carol Chomsky and others outlined long ago.

How many of these spellings can we explain to children?

<table>
<thead>
<tr>
<th>Word</th>
<th>Spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>cries</td>
<td>ridiculous</td>
</tr>
<tr>
<td>sky</td>
<td>receive</td>
</tr>
<tr>
<td>really</td>
<td>friends</td>
</tr>
<tr>
<td>ball</td>
<td>house</td>
</tr>
<tr>
<td>helpful</td>
<td>give</td>
</tr>
<tr>
<td>full</td>
<td>package</td>
</tr>
<tr>
<td>see, sea</td>
<td>knew, new, know</td>
</tr>
<tr>
<td>he</td>
<td>night</td>
</tr>
<tr>
<td>to, too, two</td>
<td>laughed, painted,</td>
</tr>
<tr>
<td>their, there</td>
<td>used, sled,</td>
</tr>
</tbody>
</table>

Teachers need to know about more than morphology to explain these spellings, but establishing the morphological structure of a word is a necessary part of that process, even for base words.

For just one example of how morphology makes sense of letter-sound correspondences, see the explanation of the spelling of *<does>* and related words that follows.

**Is <does> really an irregular spelling?**

Typically instruction leads children to believe that *<does>* is one of many irregular spellings they have to memorize. In contrast, the word *<goes>* is treated as regular.

See how the matrix ([www.realspelling.com](http://www.realspelling.com)) and word sums below make sense of these spellings by providing a concrete representation of the interrelation of structure and meaning of the *<do>* and *<go>* word families.

<table>
<thead>
<tr>
<th>Word Sums for &lt;do&gt; and &lt;go&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>do + ing → doing</td>
</tr>
<tr>
<td>do + es → does</td>
</tr>
<tr>
<td>do + ne → done</td>
</tr>
</tbody>
</table>

With these linguistic tools, children can be introduced to *<does>* as an ingenious spelling because it marks its meaning connection to its base *<do>* with a consistent spelling. The spelling structure of these word families is a brilliant opportunity to show children why it is useful that most letters (graphemes) can represent more than one pronunciation. Only in this way could the spelling of *<do>* and *<does>* use the same spelling of the base!

Instead of adding it to a list of irregular words, teachers who understand morphology can use the spelling of a word like *<does>* to introduce children to the ordered way their spelling system works.
Structured Word Inquiry: Developing literacy by making sense of English spelling

The word matrix
(www.realspelling.com)

The matrix - a map of the interrelation of structure and meaning of written word families

The word matrix represents members of an orthographic morphological word family. Such word families share a connection in both structure and meaning. (See tutorial film & resource from Real Spelling here.)

- **structure**: common underlying spelling of the base
- **meaning**: common ultimate etymological origin of the base

Inclusion of a word in a matrix is tested with a word sum. The word sum isolates the constituent morphemes (bases and affixes) on one side of the rewrite arrow (marking all morphological suffixing conventions) and on the other, the realized surface structure of the word.

An “echo” of the denotation of the root meaning of the base of any word represented by a matrix can be detected in the connotation of that realized word. The denotation of the root meaning of a word is checked with an etymological reference (e.g. etymonline.com).

Graphemes are 1-2- or 3-letter teams that represent a phoneme. They occur within morphemes. Possible phonological representations of a grapheme are signaled by circumstances. The diagram above shows three of the possible phonological representations of the `<t>` grapheme. Two of these are realized in the words of the `<quest>` matrix shown on this page.

Note that since the `<o>` and the `<e>` graphemes in `<does>` are not in the same morpheme, `<does>` cannot use an `<oe>` digraph.

The word matrix marks the only feature of an orthographic morphological family that is static - the underlying orthographic representations of its morphemes, what Carol Chomsky (1970) called “lexical spellings.”

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**Word Sums (examples listed by pronunciation of base)**

<table>
<thead>
<tr>
<th>base spelled</th>
<th>base pronounced</th>
<th>Word Sums (examples listed by pronunciation of base)</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;quest&gt;</code></td>
<td><code>/kwɛstʃ/</code></td>
<td>quest + ion → question</td>
</tr>
<tr>
<td></td>
<td><code>/kwɛst/</code></td>
<td>quest + ion + able → questionable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in + quest → inquest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>con + quest → conquest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>re + quest + ed → requested</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>matrix</th>
<th>base spelled</th>
<th>base pronounced</th>
<th>Word Sums (examples listed by pronunciation of base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>do</td>
<td>ing</td>
<td><code>/du:/</code></td>
<td>do + ing → doing</td>
</tr>
<tr>
<td></td>
<td>es</td>
<td><code>/dʌ/</code></td>
<td>do + es → does</td>
</tr>
<tr>
<td></td>
<td>ne</td>
<td></td>
<td>do + ne → done</td>
</tr>
</tbody>
</table>
Keeping an “Affix Hypothesis Chart” encourages students to share the ideas they have about possible new affixes as they are encountered. By placing them on this chart, other students know not to trust these affixes yet. On a regular basis the teacher can take up the hypothesized affixes and model using word sums and dictionaries to prove or disprove them. The proven ones get attested on the official chart. In my experience, students are always proud to get their affixes attested and not embarrassed when theirs is shown not to work. I make it a rule for students to include hypothesized word sums and their names to put up their hypotheses. Be ready for this chart to get filled up quite quickly with great theories! Affixes that you can’t resolve can be placed on the “Wonder Wall” shared with other classes. If they remain unresolved, email Pete and Melvyn to see if we can find an answer!

A selection from pdf of “reference charts” you can find by exploring this link on our website:
http://web.mac.com/peterbowers1/Site_29/WW_World_Tour_Fall_09.html
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Prefixes and their variations

A good dictionary will list prefixes as separate entries.

<table>
<thead>
<tr>
<th>Prefixes</th>
<th>Variations</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- (OE)</td>
<td>cata-</td>
</tr>
<tr>
<td>a- (Gk)</td>
<td>cach-</td>
</tr>
<tr>
<td>ab-</td>
<td>circum-</td>
</tr>
<tr>
<td>ad-</td>
<td>com-</td>
</tr>
<tr>
<td>ac-</td>
<td>co-</td>
</tr>
<tr>
<td>ag-</td>
<td>con-</td>
</tr>
<tr>
<td>al- (OE)</td>
<td>contra-</td>
</tr>
<tr>
<td>an-</td>
<td>de-</td>
</tr>
<tr>
<td>ap-</td>
<td>di-</td>
</tr>
<tr>
<td>ar-</td>
<td>dia-</td>
</tr>
<tr>
<td>as-</td>
<td>dis-</td>
</tr>
<tr>
<td>ath-</td>
<td>dif-</td>
</tr>
<tr>
<td>amb-</td>
<td>dis-</td>
</tr>
<tr>
<td>amphi-</td>
<td>dif-</td>
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<td>by-</td>
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Many elements claimed as “prefixes” are not necessarily so. For instance, <mid> and <fore> are bases, so <midday> and <forecast> are actually compound words.

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The real orthographic memory

The specific spelling memory is neither auditory nor visual.

Spelling and reading operate with different senses

The orthographic memory is, by definition, the one that governs the integrated movement patterns that produce the written or orally spelled-out word.

✓ Reading requires neither speech nor any other physical movement.

Reading requires the sense of sight. But sight is not necessary for spelling: we can correctly spell words (orally or in writing) even with our eyes closed.

Competent readers often visually misjudge spelling correctness

During real spelling workshops you meet the evidence that judging spelling correctness by ‘look’ is extremely unreliable. Spelling is not about word recognition: it is about word construction.

✓ It is possible to know how to read words that we cannot spell and to spell words that we cannot read.

The spelling memory is specifically kinaesthetic

The act of spelling is the result of integrated physical movement patterns. It is kinaesthetic. ‘Kinaesthetic’ does not, as is frequently mistranslated, mean “to do with touch”. The first element is <kine> from the Greek root <εἰνεῖν> “move” and the second element is <aesthesia> from the Greek <αίσθήτησις> “perceive, feel”.

✓ Kinaesthetic learning is about the perception, internalisation and recall of physical movement sequences. In the case of orthography this means the establishment and internalisation of integrated movement patterns of the mouth, and of finger-governed writing or keyboard activity.

The typical internalisation of a target word

1. Understand and construct the target.
2. Construct and spell out the word sum.
3. Spell out the word, separating the morpheme elements with a pause.
4. Simultaneously spell and write (or type) out the word, separating the morpheme elements with a pause both orally and in the writing.
5. Repeat step 4, but with eyes closed.
6. Simultaneously spell and write (or type) out the word with different derivational forms (e.g. by adding, subtracting, replacing affixes or by compounding).
7. The target’s spelling is now safely internalised. For recall, just set the hand and mouth simultaneously in motion.
Links & Resources

Explore the links to websites and resources listed here. To access the links throughout the document, email Pete at this address: <peterbowers1@mac.com>. I will be happy to send you the pdf that contains the hot-linked text.

Wordworks: www.wordworkskingston.com
Free resources, images, video clips and descriptions of this instruction in action around the world.
• Videos of structured word inquiry in practice: www.youtube.com/user/WordWorksKingston
• WordWorks Newsletter: Email us at wordworkskingston@gmail.com to receive our free Newsletter with updates, Word Detective Episodes and frequent extra resources.
• Teaching How the Written Word Works (Bowers, 2009). This book builds on the 20 session intervention study I conducted (Bowers & Kirby, 2010) in Grade 4 and 5 classes. The lessons with the <sign> and <move> matrices are the first lessons in that book. Email wordworkskingston@gmail.com to order a copy.

The Real Spelling Tool Box 2 www.realspelling.com
This is not a spelling program or teaching approach. It a reference that explains how English spelling works. The linguistic rigour and clarity in this reference allows learners to become word scientists.

The 70 Matrix Disk: (follow links at www.realspelling.com)
An excellent starting point for teachers.

The Word Searcher: http://www.neilramsden.co.uk/spelling/
A key free tool for collecting words according to surface patterns so that word scientists can investigate the substructure of words. This is an invaluable tool for your spelling investigations. The above link includes a link to a free eBook to see how you might use it in the classroom.

Real Spellers: www.realspellers.org
This new website by Matt Berman (Grade 4 teacher at Nueva School!) is an excellent site for resources and spelling discussions from teachers around the world.

LEX (Linguist-Educator-Exchange) http://linguisteducatorexchange.wordpress.com/
An excellent blog by Gina Cooke for educators who trying to make sense of the linguistic structure of words.

LEX Grapheme Cards
A reliable reference of grapheme-phoneme cards from Gina Cooke. Email <ginacooke@sbcglobal.net> to order.

The Word Microscope:
http://www.neilramsden.co.uk/microscope/index.html
This software allows the user to construct matrices from word sums, search for likely members of morphological families and much more. It guides learners in their quest to make sense of English spelling.

Research Notes
To understand English spelling, we need to understand the interrelated nature of morphology, etymology and phonology. Morphology has been ignored or sidelined in typical classroom instruction (Nunes & Bryant, 2006). Meta-analyses show morphological instruction brings benefits in general, and in particular for less able readers (Bowers, Kirby, & Deacon, 2010; Carlisle, 2010; Goodwin & Ahn, 2010). Bowers, Kirby, and Deacon (2010) also found that morphological instruction was as effective or more in Preschool to Grade 2 as it was in Grades 3-8. The matrix and word sum provide tools teachers need to make sense of English spelling with their students.

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