

Teaching Students How to Gain Meaning from Print:
Applying the PYP philosophy of structured inquiry to the
well-ordered meaning structure of English spelling

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This article discusses an approach to literacy instruction designed to build a level of explicit linguistic awareness that typical instruction fails to develop. It is suggested that children in elementary school can be taught to apply this explicit linguistic knowledge in support of the process of gaining meaning from the written word; thereby building reading, vocabulary and spelling skills. It is also shown that a “structured inquiry” instructional approach, as emphasized by the *Primary Years Programme Monograph* (2001), can be applied to the written word as long as teachers are given resources based on the ordered structure of English spelling. In order to clarify this explicit word structure instruction, and to illustrate its potential for encouraging student learning and skill with regard to the written word, I will draw from linguistics, recent reading research findings, philosophy of education, and my own experience teaching this form of instruction in my grade four class in a private international school.

The literacy instruction described here is not novel. Marcia Henry’s *Unlocking Literacy: Effective Decoding & Spelling Instruction* (2003) is an example of an excellent resource for teachers that supports reading and spelling instruction aimed at helping students learn how word origins, letter-sound correspondences and morphological structure work together to make sense of the English writing system. Her work (e.g., Henry, 1988, 1989, 1993, 1994, 1997, 2003) has consistently emphasized the importance of teaching children how the English orthography system works as a support for literacy development:

“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.... When teachers and their students understand the historical basis and structure of written English, they can better understand the regularities as well as the few irregularities in English words.” (Henry, 2003, p. 29)

The thesis of this paper has many important parallels to, and is informed by Henry’s excellent work. However, the instruction described here draws mainly from my experiences as a grade four teacher using a resource developed by Melvyn Ramsden (2001) called Real Spelling. Currently there is an energetic community of teachers using this resource in at least 33 countries around the world on three continents. The instruction guided by Real Spelling presents students with a linguistically accurate, coherent picture of the orthography system based on its three interrelated elements: morphology, etymology and phonology. For space considerations, I will focus here on instruction aimed at revealing the morphological building blocks of words (bases and affixes) and how these meaning units interact with phonology (pronunciation) to represent meaning. Regardless of the specific set of teaching materials used, *the distinguishing feature of the instruction being discussed is adherence to the premise that instruction of the written word needs to be designed to build understanding of how English orthography is structured to represent meaning.* Math or science instruction is expected to build an understanding of the underlying constructs being taught. It seems straightforward to apply that same principle to instruction of the written word.

It is true that most people who have learned to read and write effectively were never taught the underlying structure of English orthography. The form of instruction emphasized here is by no

means *necessary* for most individuals to learn to become proficient readers and writers. However, I argue that direct, systematic instruction revealing the ordered and coherent conventions of English orthography provides students with a more engaging and generative educational experience than is offered through typical literacy instruction. Also, while most students become effective readers and writers through traditional instruction, many students continue to struggle. Perhaps those struggling learners particularly need explicit instruction about how the structure of the written word links to meaning. As one of the leaders in research about the role of morphological awareness in reading, Joanne Carlisle (2003) argued, “Many students could benefit from learning about the English writing system, not just students who are at risk for reading or language learning disabilities or who are English language learners. Leaving morphological analysis to be discovered by students on their own means that those who are not inherently linguistically savvy are likely to be left behind their peers in the development of vocabulary, word reading and comprehension, and spelling” (p. 312).

Reading research on Morphological awareness: Implicit or explicit awareness?

The role of children’s morphological awareness in the development of literacy skills has become a major interest in the reading literature. Research (e.g., Carlisle, 2000; Fowler & Liberman, 1995; Singson, Mahony, & Mann, 2000) suggests a reliable connection between morphological awareness and reading with an effect of around 5% after controlling for variables such as vocabulary and short-term memory (Deacon & Kirby, 2004). Few studies on morphological instruction have been reported, but two frequently cited studies (Nunés, Bryant & Olsson, 2003; Arnbak & Elbro, 2000) describe modest, but promising effects for reading and spelling skills. It is important to note that neither of these intervention studies was designed to present students with an overall understanding of how spelling systems are designed to represent meaning. Particular care is needed when considering Arnbak and Elbro’s results in relation to English language classroom instruction, as their study was conducted using small group instruction with Danish dyslexic children. With that in mind, it is still worth emphasizing that while their intervention was limited to oral morphological instruction, the strongest effect they found was in increased spelling accuracy. If oral morphological instruction *without practice reading or spelling words* can improve *spelling*, it is tempting to expect *written* morphological instruction would bring even greater success for spelling accuracy. Perhaps such instruction would also bring benefits for reading and vocabulary skills. Clearly more intervention studies are needed. For the moment, however, one point to keep in mind when considering the results of morphological awareness research is that teachers currently have little knowledge of English morphological structure to support the development of students’ morphological awareness (Henry, 2003). Thus the morphological awareness measured in children, which has been found to impact literacy, is largely an implicitly gained awareness.

The distinction between explicitly or implicitly gained morphological awareness is one that needs particular emphasis. A key feature of spoken English is that its morphology is not consistently represented by its pronunciation. For example, the plural morpheme that can be represented with the written suffix <-s> is pronounced /s/ in some words (e.g., cats) and /z/ in others (e.g., dogs). In some languages like Finnish, morphology is consistently revealed by its phonology (pronunciation). This is not the case in English. The words <real> and <reality> use the same base morpheme, even though they are pronounced differently. The nature of spoken English is such that *representing morphemes with consistent spelling necessitates elastic sound-letter representation*. A language where pronunciation consistently represents its morphology is

able to have both a highly consistent letter-sound correspondence *and* spellings that consistently represent morphology. This is simply not possible in English.

Maintaining a consistent representation of bases and affixes (morphology) in spelling has important advantages. This system allows the spelling system to remain consistent despite changes in pronunciation over time. Updating spellings as pronunciation shifts over time would bring obvious difficulties. Consistent morphological representation, but elastic letter-sound correspondence also allows all speakers of English to share the same spelling system. It is a matter of some convenience that whether spoken on Brooklyn, Toronto or Singapore streets, the stage in London or the Australian outback, the word <car> is spelled the same. Stephen Pinker (1999), points out, "Clearly the perception of an embedded word comes from its spelling: become contains c-o-m-e; succumb doesn't. Samuel Johnson, who standardized the spellings of thousands of modern words, used people's perception of the anatomy of words as a rationale in his decisions, and that is one of the reasons that spellings of English words notoriously do not always reflect their sounds; often they reflect morphological structure instead"(p. 45).

Reading research, literacy instruction and the structure and purpose of English orthography

Interpretation of morphological awareness research findings needs to be mindful of the nature of instruction and English orthography. The emphasis in schools and at home is on sound-letter cues. Words where those cues appear inconsistent are often treated as nothing more than frustrating irregularities. While some prefixes and suffixes receive direct instruction, teachers and parents are ill-prepared to guide students toward noting morphological cues in many words. Typical instruction would not point a student towards the morphological connections between *sign* and its derivations such as: *signal*, *signature* or *designate*. Not surprisingly, research also tells us that children demonstrate less awareness of morphological cues in what have been labelled "opaque" words. These are words where shifts in phonology (e.g., *do+es* → *does*), spelling (e.g., *hope/+ing* → *hoping* vs. *hop(p)+ing* → *hopping*) or semantics (e.g., *as+sign* → *assign*) mask cues to meaning preserved in written morphology (Carlisle, 2003). Not only is children's morphological awareness developed with very limited instruction, but also emphasis on sound-letter correspondences may well direct students *away* from morphological cues in derivations where pronunciation shifts. Despite a less than optimal match between instruction and the structure of English orthography, morphological awareness has been found to contribute to literacy skills. This state of affairs gives us additional cause to consider the potential benefit of explicit instruction of written morphological structure and how it interacts with the pronunciation of words.

What would happen if instruction pointed at how the writing system works?

The structure and purpose of English orthography, and how this system can guide instruction of the written word, frame the two fundamental and related propositions this paper offers for consideration.

- 1) Teaching the linguistic structure of the written word offers students both orthographic knowledge and critical thinking experiences that support reading, vocabulary, and spelling skills. Studying our ordered, predictable writing system allows and encourages independent hypothesizing and testing of connections between meaningfully related words, which in turn develops students' ability to gain meaning from text.

- 2) Application of these instructional strategies to the written word is not possible for teachers who are resourced with educational materials that fail to represent the coherent, consistent conventions of how English spelling is structured to represent meaning. Typical literacy instruction denies students access to generative orthographic knowledge and skills that could potentially have a great impact on their literacy.

Schools regularly feed into the common assumption that English spelling is an irregular, exception-riddled system. The more irregular a system is, the more its study is forced to rely on memorization strategies. Such strategies are designed to attack the spelling and reading of individual, or small groups of words rather than systemic understanding for how print is structured to represent meaning. This is one way that misrepresenting English spelling as irregular has had such a limiting effect on instruction, and consequently, student learning. The highly consistent, meaning based structure of English spelling that linguists (e.g., Chomsky, 1970; Venezky, 1970, 1999; Pinker, 1999) have long described can – and I argue *should* – be placed at the heart of a problem-solving, structured inquiry approach to instruction. In an ordered system, each new piece of understanding of how that system works provides conceptual leverage to gain a deeper understanding of that same system. In math, understanding addition supports the learning of multiplication, which supports the ability to understand division, fractions and so on. The ordered and consistent orthography system that we have makes this kind of generative learning experience possible in the context of the written word – *as long as teachers are told how the system works.*

Consider the educational value of instruction based on memorization strategies as compared to the “structured inquiry” approach emphasized in International Baccalaureate (IB) Primary Years Programme (PYP) that has become a fundamental resource to schools around the world. The *Primary Years Programme Monograph* (2001, p. 3) states:

“Inquiry, interpreted in the broadest sense, is the process initiated by the learner or the teacher which moves the learner from their current level of understanding to a new and deeper level of understanding. This can mean:

- exploring, wondering and questioning
- experimenting and playing with possibilities
- researching and seeking information
- collecting data and reporting findings
- clarifying existing ideas and reappraising events
- deepening understanding through the application of a concept or rule
- making and testing theories
- making predictions and acting purposefully to see what happens
- elaborating on solutions to problems.

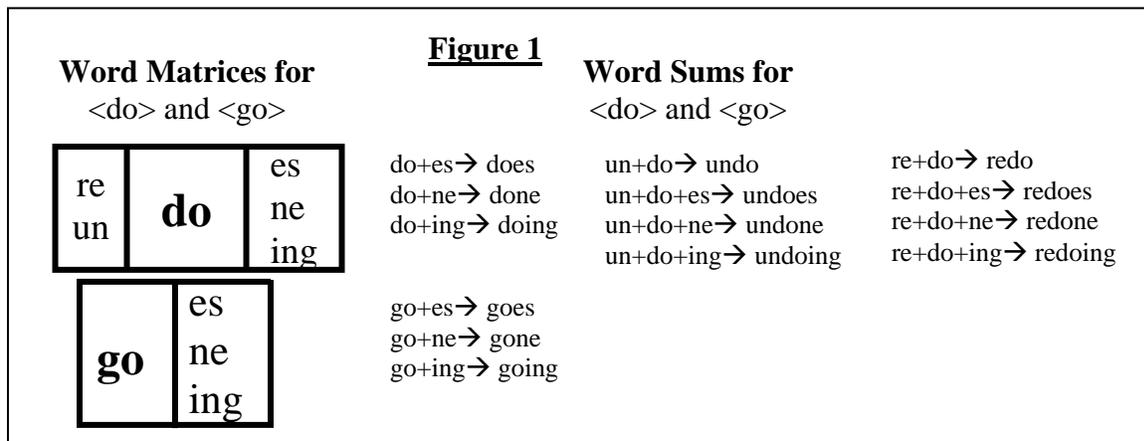
It continues...

“Inquiry involves the synthesis, analysis and manipulation of knowledge, whether through play for younger children or through more formally structured learning in the primary years.”

An ordered system invites structured inquiry

Some contexts of study are more open to this instructional approach than others. For example, while the concept of multiplication can be developed from a wide variety of instructional strategies, there is a point where memorization of the basic multiplication facts needs to be accomplished for the development of higher-level math skills. However, when a content area provides a choice between “rote memorization” or “structured inquiry” instructional strategies, there are few who would argue that rote memorization brings greater educational value. Where possible, educators seek to apply the philosophy as described by the PYP. This approach is seen as more likely to support a productive learning environment where students become intrinsically motivated learners who identify interesting questions, who learn how and where to look for answers, and who pose and test their own hypotheses. When done effectively, the type of instruction emphasized by PYP turns the classroom into a community of curious children, actively engaged in the process of learning. A point to underscore here is that it wasn’t until my tenth year of teaching, while working with Real Spelling in my grade four class, that I became aware that *our writing system is structured in a way that invites and encourages exactly the kind of instruction called for by the PYP*. However, teachers simply cannot apply the PYP philosophy to written word instruction when they use materials that fail to support comprehensive orthographic knowledge. To clarify this distinction, a closer look at English orthography and the instructional options it generates is needed.

When our view of English spelling is limited to sound-symbol system correspondences, in too many cases, it *acts* like an irregular system that teachers and students just have to make do with. A sound-centric view of spelling sees words like <does> or <business> as frustrating obstacles to learning. In contrast, teachers with accurate orthographic knowledge see these words as particularly fruitful starting points for the type of educational experiences the PYP philosophy argues teachers should be seeking to develop in their classroom. Armed with such knowledge, a teacher could present the words: *do, does, done; go, goes, gone* as the beginning of a “structured inquiry” aimed at revealing a fundamental principle underlying the structure of spelling that Venezky (1970) called the “morphophonemic principle”. This principle states that English spelling represent both morphemes and phonemes, and that morphemes (bases, prefixes and suffixes) are represented consistently even when pronunciation (phonology) shifts (e.g., *do+es* → *does, do+ne* → *done; go+es* → *goes, go+ne* → *gone*). Ramsden (2001) developed the “Word Matrix” and uses it along with the linguistic convention of “word sums” (see Figure 1) as instructional tools that help teachers and students see the structure of connected families of words regardless of pronunciation shifts.



These are powerful tools for revealing the fundamental morphological structure and “morphophonemic” nature of English spelling that has been understood by linguists for years, but seems to be virtually ignored in typical literacy instruction.

Similarly, if teachers know how the system works, they can ask students to consider the parts of the word <*business*> they recognize that might connect to other words with similar meanings (see Figure 2). Just as studying consistent patterns in math helps students discern number patterns that they could not see before, students with experience working with the consistent spelling structure, start to see patterns that always existed, but lacked saliency without explicit instruction. A student who has learned about words through this instruction is more likely to recognize the suffix <-ness> and the base <*busy*>. The fact that the <y> has changed to <i> is less of a hindrance to seeing this structure for students who have been taught the consistent suffixing conventions and who have learned that bases and affixes are consistently spelled meaning cues regardless of pronunciation. (See Appendix 1 for more word matrices.)

Figure 2			
busy	ness	es	busy/i+ness → business busy/i+ness+es → businesses busy/i+er → busier busy/i+ness+man → businessman busy/i+est → busiest busy/i+ness+woman → businesswoman
	er	man	
	est	woman	

Morphological instruction is more than teaching common prefixes and suffixes

Traditional curricula often include instruction about prefixes and suffixes, but not in a way that is designed to reveal the consistent meaning structure of English orthography. Teacher resources supporting instruction of suffixing patterns often present these patterns as sets of disconnected “rules of thumb” that target the spelling of a limited group of words but do not attempt to build a coherent understanding of the underlying principles of the writing system. To illustrate this point, I will compare and contrast two examples of how typical ‘word study’ instruction often touches on parts of underlying orthographic patterns, but fails to recognize or reveal the complete pattern that invites and enables the type of structured inquiry instruction emphasized by PYP. First, however, a word of ‘warning.’ The morphological suffixing patterns presented below may seem overly complicated when introduced all at once. After going through the patterns, I will discuss my own initial fear of this issue, and why this fear proved unfounded in the end.

Typical suffixing instruction deals with the common <-ed> and <-ing> suffixes. A pattern frequently taught is that these suffixes force the dropping of the silent <e>. Isolating these two specific suffixes, however, reveals either limited orthographic knowledge or a limited view of instructional possibilities. Why not design lessons so that students learn to identify the two categories of suffixes – vowel suffixes and consonant suffixes – and how these suffixes differ? One of those differences is that consonant suffixes do not force the dropping the single, silent <e>, but vowel suffixes do (e.g., *for+give+ness* → *forgiveness*, but *for+give/+ing* → *forgiving*). While it is useful to learn how the frequent suffixes <-ed> and <-ing> act, what is the educational value of separating these suffixes from all vowel suffixes? Teaching patterns for just these two suffixes could productively be framed as an introduction to the larger pattern for all

vowel suffixes, but Real Spelling is the only resource I have encountered that emphasizes the distinction between vowel and consonant suffixes.

Consider the potential consequences of teaching a pattern that applies to just two suffixes rather than the underlying distinction of vowel and consonant suffixes that informs knowledge about all suffixes, including those that children have yet to encounter. Learning about the <-ed> and <-ing> suffix tells students nothing about consonant suffixes or the rest of the vowel suffixes. Teaching the deeper underlying convention offers a generative piece of knowledge that applies to more than one context. Awareness of vowel and consonant suffixes, which is developed in lessons on the pattern for dropping the single, silent <e>, prepares students to learn the pattern for consonant doubling more easily. It is only vowel suffixes that *can* cause doubling to occur. Instruction that aims at one suffixing pattern for two common suffixes is not incorrect; it is severely limited. It is limited in that it fails to inform the underlying pattern that makes the <-ed> and <-ing> suffix act similarly, and it is limited in that successful learning of the pattern for these two suffixes and the single, silent <e> is not a piece of knowledge that is likely to be used to help students see other orthographic patterns. *Typical literacy instruction does not seek out and build the generative concepts offered by the English orthography system.*

Let us consider one more example of how teaching disconnected “rules of thumb” fails to build a coherent understanding of the writing system. A “spelling rule” many teachers will recognize from various spelling resources for adding suffixes to words ending in <y> goes something like this: When making a plural out of a word that ends in <y>, change the <y> to <i> and add the suffix <-es>. Along with that pattern, a sample of the many exceptions to this “rule” (e.g., *monkeys, holidays, toys*) is frequently offered for memorization. Again, by teaching this isolated and limited understanding of the suffixing conventions, the student is left with a “rule of thumb” that works for a limited group of words, and this “rule” has an unpredictable number of “exceptions”. In contrast, instruction built on the actual morphological suffixing patterns of English orthography can build knowledge of suffixing conventions that is consistent and links to other meaningful patterns. The full conventions of when to change a <y> to <i> is not limited to the context of adding plurals; it applies to *any* situation when a suffix is being added to word stems ending in <y>. This convention can be stated as follows:

When adding a suffix to a word ending in <y> change the <y> to <i> except...

- a) If doing so would create an <i+i> combination. It is a law of English orthography that no complete English spelling can have <ii> because in connected script this would have been easily confused with the letter <u>.
- b) If the word ending in the letter <y> is preceded by a vowel letter. In English spelling, a <vowel+y> is an unalterable combination. (This consistent pattern shows that spellings such as *monkeys, holidays and toys* are not exceptions that need to be memorized).

There is a third morphological pattern that can be presented in this context that strictly speaking is not a “suffixing” rule because it relates to the formation of compound words where bases are joined to form words instead of adding a suffix to a base. The consistent orthographic convention for the building of compound words is that it never causes a

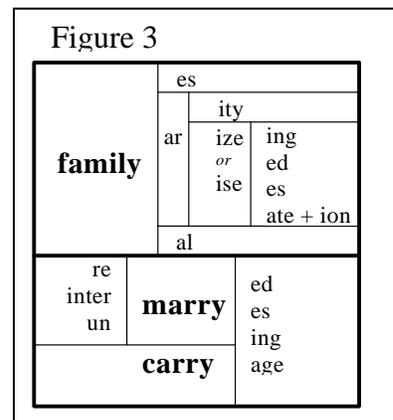
change in spelling of either base. Thus words like <busybody>, <hothouse> and <bookkeeping> may *appear* irregular, but are in fact orthographically consistent.

I was introduced to the full <y/i> conventions while using Real Spelling with my grade four class. In preparing for the class, I was concerned about presenting my students with a detailed recipe of rules that they would have difficulty memorizing. I was also uncomfortable with the fact that I felt like I was moving back into a situation where I was asking children to memorize rules. The experience, however, emphasized a value of aiming instruction at the coherent organization of the spelling system that I had not yet understood. As we began to work with these new patterns, it became clear that my students had already internalized two of them. Previous lessons on other orthographic topics had revealed that the <i+i> combination was not allowed in complete English words, and that compounding never changes the spelling of either base. The only new piece of information being presented to my students was the idea that a <vowel+y> combination was unalterable. Because of the instruction that preceded this new lesson, my grade four students were able to quickly internalize what I thought would be complicated patterns for the <y/i> conventions. (See Appendix 1 and 2 for flow charts that students used to help them practice and consolidate these patterns.)

Orthographic instruction produces “Spelling Detectives”

It is important to add that, while overwhelmingly consistent, there are English spellings that do not conform to these underlying patterns. For example, the spelling <daily> can be seen as a “true exception”. The <y> has changed to <i> even though it is preceded by a vowel (day+ly). Exceptions to the structure and purpose of English spelling, however, are so infrequent that in a year of studying these patterns, my class probably came across less than ten spellings that “misbehaved”. We treated it as a source of some celebration of our “spelling detective” skills when we succeeded in demonstrating that a spelling didn’t have a good explanation. Importantly, this level of non-compliance to the patterns we were studying was far too small to inhibit a structured inquiry into an ordered system.

As when students become more proficient with times tables, my class had developed tools allowing us to dive into working out deeper meaningful patterns. With knowledge of all the suffixing patterns at our disposal (see Appendix 2 for a flow chart students used to consolidate these patterns), we could build and decompose words into their meaningful units effectively. These tools, combined with the explicit instruction that the spelling of morphemes remains consistent despite pronunciation shifts, turned the spelling system from a frustrating irregular system into a potentially fascinating puzzle to play with. The consistent, integrated orthographic patterns we had been investigating provided a growing knowledge base that could be used as a tool to explore the written word for spelling/meaning cues. Carlisle (2000) wrote, “Morphological awareness, as it contributes to reading, must have as its basis the ability to parse words and analyze constituent morphemes for the purpose of constructing meaning” (p. 170). Consider the educational value of a word study program that builds to the point where students have the knowledge and skills needed to confidently build words from the morphological word matrix for the words <family>, <marry> and <carry> (see Figure 3). Students with explicit linguistic



instruction can discover the link between words like <carry> and <carriage> (carry/i+age→ carriage), <marry> and <marriage> (marry/i+age→ marriage) or even <family> and <familiarization> (family/i+ar+ize/+ate/+ion→ familiarization). There is no reason to believe that, after being introduced to the word matrix as a tool to help students recognize morphemic units and patterns that they would have the skills to produce matrices of their own. This is an instructional strategy I did not emphasize enough in the classroom.

Seeing how the system links words that may have previously seemed disconnected promotes a curiosity to investigate the written word for interesting discoveries. Gaining this knowledge base through a structured inquiry approach also provides a context for teachers to model the kind of orthographic inquiries that children can learn to apply on their own. For example, this instruction managed to create an environment in my class where my students rushed to get the bigger “better” dictionaries. They even waited impatiently to get their hands on the new word origin reference I brought to class. I was amazed one day when a student exclaimed in frustration, “Who’s got the Ayto?” Unbeknownst to me, our class copy of *Dictionary of Word Origins* (583 pages!) by John Ayto (1990) had been dubbed “*The Ayto*” by my grade four students. Being shown that there was a meaning pattern in the spelling of words, and developing the tools to work them out, turned drab looking thick reference books into tools that had answers to questions students wanted to solve.

Instruction of the written word that draws heavily from Vygotsky, Bruner and Dewey

Once teachers see that the written word is a system for encoding meaning that is accessible to children, the study of the written word is transformed from a hurdle to get past into a tool that pushes learning forward. The same PYP document (p. 3) cited earlier references Williams and Woods (1997) quote of Vygotsky’s definition of learning as “the creation of meaning that occurs when an individual links new knowledge with...existing knowledge” The document continues, “Other theorists, including Bruner and Gardner, have argued that the focus of teaching curriculum content needs to change to enable teachers to make connections between learners’ existing knowledge ... in the context of new experiences.” It is the responsibility of educators to provide accurate knowledge about how the written word is structured to represent meaning. When we meet that responsibility, students are able to use that knowledge to help them make sense of words they will encounter in the future. Typical literacy instruction unnecessarily closes doors to rich learning experiences.

Students who study how the English orthography system works to represent meaning through a structured inquiry approach are at a great advantage over their counterparts who receive typical literacy instruction. Students with explicit orthographic knowledge can learn how to wrestle meaning from the spellings of words during “spelling class,” and then they apply that knowledge in any context. Only a few weeks into my first attempts at teaching orthography through Real Spelling, my grade four students used what we were learning about the writing system to make sense of what we were learning in science. As I introduced the word *photosynthesis* in a new science unit, the first question from students was “How is it built?” While a word like this is often deconstructed in textbooks, it was a sign to me that something important was going on when my students were initiating such a question. They were demonstrating that they had independently internalized the idea that breaking down the spelling of a word helps them understand that word. We made the word sum: *photo+synthesis* → *photosynthesis*. I had the students refer to a dictionary that showed us that <photo> meant “light” and that one meaning of

<synthesis> had to do with “producing something new by combining different parts”. So “photosynthesis” had to do with the process that plants use to turn light energy into food energy for the plant to grow.

It seemed to me that orthographic knowledge was breaking down the tendency for students to attempt to memorize a word like *photosynthesis* in one compartment of their understanding and the process it describes in another. Just a few weeks of orthographic study had helped us see that the word itself points to the concept it describes. This message continued to be reinforced all year. When we did our final large web on the word <graph> for ‘writing or mark,’ students found over 90 words using 15 prefixes and 18 suffixes. The links between concepts and spelling in a wide variety of subjects was impossible not to see. The meanings of two concepts we were studying at the time, <paragraph> and <parallel> informed each other. It made sense that the words <biography> and <autobiography> had to do with writing about the life of people. The idea that a <photo+graph→photograph> was a kind of ‘writing or mark with light’ was a fascinating idea to consider. The word <calligraphy> brought one student to another word I had never heard of before, <calliphone>, and a bound base <calli> I had never considered before, for ‘beautiful’ (A bound base is a base that cannot stand as a word, but when combined with affixes builds a family of derivations of connected meanings. For example, we studied the bound base <rupt> for ‘break’ that creates words like *rupture*, *interrupt*, *corrupt*, *eruption*. See Appendix 1 for a word matrix on the bound base <vac> for ‘empty’.) It turned out that <calliphone> was an instrument like a xylophone that must make a ‘beautiful sound’ just like <calligraphy> is beautiful writing.

This area of elementary instruction has particular links to work that Henry (e.g., 1988, 1993, 1997, 2003) has long emphasized. “The Latin word roots are probably among the most productive elements for students to learn in the sense that the roots are important for enhancing vocabulary, for decoding, and for spelling. A relatively small number of Latin roots and affixes and Greek combining forms appear in hundreds of thousands of words (Henry, 2003. pp. 41-42)”

For me, the work of Ramsden and Henry echoes and puts into practice the educational philosophy articulated in Dewey’s *Experience and Education* (1938/1997) which provides a particularly powerful description of what accurate orthographic knowledge can bring to instruction of the written word.

“Perhaps the greatest of all pedagogical fallacies is the notion that a person learns only the particular thing he is studying at the time. Collateral learning in the way of formation of enduring attitudes, of likes and dislikes, may be and often is much more important than the spelling lesson or lesson in geography or history that is learned. For these attitudes are fundamentally what count in the future. The most important attitude that can be formed is that of the desire to go on learning. If impetus in this direction is weakened instead of being intensified, something much more than mere lack of preparation takes place. The pupil is actually robbed of native capacities which otherwise would enable him to cope with circumstances that he meets in the course of his life” (p. 48).

The instructional philosophy described in the PYP Monograph (2001) draws from this same educational well. “...[E]ducating children in a set of isolated subject domains, while necessary, is not sufficient. Of equal importance is the need to acquire skills in context, and to explore

content that is relevant to children and transcends the boundaries of the traditional subjects. ‘To be truly educated, a student must also make connections across the disciplines, discover ways to integrate the separate subjects, and ultimately relate what they learn to life’ (Boyer, 1995)” (p. 6). The instruction I am describing gives students guided practice working with the meaning structure of words with the aim of developing students’ explicit orthographic knowledge. This knowledge and practice in turn builds their skill at morphologically decomposing novel words into recognizable components of meaning with links to other words. Surely such skills and corpus of knowledge should be an important target of a philosophy of education as described by the PYP and informed by educational philosophers such as Dewey and Bruner.

My experience with Real Spelling had revealed the English spelling system as both a context and tool for learning in a way I had never witnessed in the classroom before. At the end of the year, I presented my students and parents with an anonymous survey in an attempt to gain additional insight into their perspectives on this instruction. With a 100% response rate, both groups provided an overwhelmingly positive description of the experience. (A report on the findings of that survey is available upon request.) With the support of Real Spelling, I was able to provide my students with written word instruction using the model that PYP expects teachers to emphasize. This link between the PYP structured inquiry instruction and the written word requires teachers to be provided with materials revealing how the English orthography system works. Once that learning begins, the educational value of orthographic instruction is not restricted to spelling, vocabulary and reading skills. It is a tool that supports student inquiry and learning in all subjects. Once the system is revealed to children, it is not forgotten like the spelling or definition of a word studied for a test yesterday, last week or last year. Once we know how to look for them, the consistent meaning patterns of our orthography system present themselves in the endless stream of text we are exposed to every day.

Studying the patterns of how English orthography represents meaning can set a generative cycle of learning in motion. The message that there are meaningful orthographic patterns to look for, combined with sufficient orthographic knowledge, motivates students to investigate these meaningful patterns independently. The more practice students get noticing and investigating patterns, the better they get at the process of gaining meaning from print. Especially early on, students hypothesize non-existent morphological connections. A famous example in the morphological awareness research is the question “Is there ‘corn’ in ‘corner’?” The letter string c-o-r-n and what looks like the suffix <-er> can tempt learners to see a connection that does not exist. This problem is addressed by the fundamental message that teachers need to constantly reinforce when investigating the spelling system. Spelling inquiries need to be guided by *meaning*.

When supported with orthographically accurate, explicit instruction, students learn to distinguish meaningful from coincidental patterns by learning to test morphological hypotheses with references. This is why my students were impatient for “*The Ayto*”. They had developed a spelling hypothesis they wanted to test. I like to introduce students to the necessity of testing hypotheses of morphological connections with meaning by asking children if the suffix <-ing> is in the word <king>. Because the meaning connection is so clearly absent, and the structure would be so absurd <*k+ing>, children can see that a similar letter patterns is not *sufficient* evidence of a morphological link; links of meaning need to be demonstrated as well.

Structured orthographic inquiries creating a community of learners in the classroom

The more experience children get refining their skills at orthographic investigation in the classroom, the more motivated and skilled they get at independent orthographic inquiry. Sometimes the link is so obvious that references are not necessary (e.g. help/helpful). Sometimes what seemed like a fairly small question requiring confirmation from a reference leads to entirely unexpected discoveries. For example, one of my grade four students began an independent orthographic investigation based on the thought that the words <secret> and <secretary> might be connected. After being compelled to confer with a standard dictionary, a word origin dictionary (Ayto, 1990) and the class favourite, a word stems dictionary (Kennedy, 1890/1990) the student lead us to the discovery of the twin base <crete/cern> for ‘separate’ or ‘distinguish’ which builds words such as <discrete> and <discern>. At first we were troubled by the fact that the hypothesized word structure <se+crete/+ary> required the existence of a prefix <se-> that we had not run across before. Further investigation revealed that <se->, while rare, was indeed a prefix which usually has the idea of “apart, aside, without”. The class thought it interesting that the word <secret> probably had to do with keeping some information separate from others. Along the process of this inquiry, the student also discovered a distinct base with the same spelling <crete> that carried the meaning ‘chalk’ and built words like <cretaceous> for the ‘cretaceous period’. While at first confusing, this discovery introduced us to the idea of ‘eponyms’ or ‘toponyms’ – words that come from the name <onym> of a physical location. Among others, we discussed words like <bikini> named for the tropical island of the same name, and <hamburger> from the German city. It turned out that the base <crete> for ‘chalk’ (as distinct from the twin base <crete/cern> for ‘separate, distinguish’) came from the Greek island of Crete, which is known for the chalk rock from which it is mainly built.

While the preceding story reflects learning offered to our class by a particularly strong student, discoveries that grabbed the attention of the class were frequent occurrences instigated by students of all abilities. Only a couple of weeks into our work with Real Spelling, a student who struggled with reading and writing and suffered from a low self-esteem in these areas taught us an important orthographic lesson. During silent reading, this student came to me with his *Goosebumps* book. My assumption before he started to talk was that he was really just looking for an excuse to avoid reading for a few minutes. It turned out that he had been reading and had noticed the word <revving> and thought it looked odd. I agreed. It had come up in an aside to a previous discussion, that English words were designed to avoid a <v+v> combination as it could easily be confused for a <w>. This explains the purpose of a silent <e> at the end of words like <love>, <have> or <give>. One purpose of the single, silent <e> (that is available since English orthography is designed with an elastic letter-sound correspondence) is to avoid words ending in <v>. If they did, adding vowel consonants might cause the confusing doubling of the letter <v>. So what was going on with the spelling <revving>? We applied our brand new orthographic knowledge and hypothesized the word sum: rev(v)+ing → revving. We consulted our new consonant doubling flow chart (see Appendix 2 for the large one we hadn’t been introduced to yet). We could see that we were adding a vowel suffix to a single syllable word ending with a single consonant letter and there was just one vowel letter before that. The chart said to double the consonant. We checked the dictionary and saw that the spelling <rev> and <revving> were attested spellings. By now I had interrupted the class’ reading and we were working together to try and solve the puzzle. Why was this word “misbehaving”? Had we found a “true exception”?

It was our teacher aid who first found the explanation. She reminded the class to think about what the word <rev> meant and some related words. Another student beat me to the answer. The word <rev> was for “revving” your engines, which had to do with the word <revolution>. Someone remembered the term “revolutions per minute” for RPM. With further research later on, we were able to build the structure of the word <revolution>: re+volute/+ion. The base <volute> is part of the twin base <volute/volve> for ‘turn’. When you “rev” your engine, you are “turning it over.” The word <rev> that looked so odd, and which created the equally odd looking <revving> was a “short form” (we later learned the official linguistic term ‘clip’) for <revolution>. The spelling of this short form (or clip) had been built from the prefix, and the first letter of a base morpheme became a base of its own. The spelling <*reve> was not possible because it would hide the connection to its source. Since two rules came up against each other, the more important one – the one with a more direct meaning connection – won out. What a great story for the class to discover by noticing the spelling of a word.

Whether or not we had been able to sort through all that, there was a more important message to me as I began my attempts at this instruction. A child who really did not like reading, writing and spelling had read the word <revving> outside of official spelling class. With only a few weeks of our new instruction under his belt, he recognized that asking a question about an odd spelling might lead to an interesting discovery. The child who usually felt embarrassed about spelling or reading tasks became the star “word detective” that day. He had identified a pattern that took the whole class a lot of effort to work through and given us all the reward of a new discovery.

Notice the culture of learning that grew from this new perspective on the writing system as a sort of “treasure map” of meaning that could be used as a guide to endless discoveries. It seems to me that these stories effectively embody the spirit of the educational philosophy emphasized by the PYP and Dewey’s “Experience and Education.” I have not heard of, nor can I imagine stories approaching this type of learning experience based on typical written word instruction.

The English orthography system is not “easy” to understand, but failing to represent it accurately does not make learning *from* and *with* it easier. The fact that it is a complex web of meaning cues that learners are confronted with daily makes it a particularly generative context for critical thinking experiences, especially when guided by knowledgeable teachers through a structured inquiry approach. The philosophy of education articulated by theorists like Dewey, and promoted by curricula such as the PYP, asks teachers to create exactly these educational experiences for children. If we accept that philosophy, it is our responsibility to provide teachers with the knowledge required to bring this form of instruction to the written word.

Postscript (Post+script→ ‘after’+’writing’)

Tools for orthographic instruction

Revealing orthographic structure and how it links words may be the best way to reveal the educative power of the orthography system. For that reason, additional orthographic instructional tools (Ramsden, 2001) are included in the appendix with permission of the author. I have also included an activity I designed for the classroom intervention study I am conducting for my Master’s thesis at Queen’s University. This activity is intended to provide a practical example of how these tools can be employed to support structured inquiry of the orthography system.

Orthography instruction: More than morphological

The main purpose of this ‘postscript’ is to touch on the wider structure of English orthography that I argue children should be taught in the classroom. This argument follows from the thesis that if reading is the process of gaining meaning from print, students need to be taught how the writing system represents meaning. This position gains support from the view on literacy instruction described by some of the most prominent names in reading research. “At some point, children who learn to read must learn how their language is represented in the writing system. This knowledge is not a natural end point of a developmental progression; rather it is usually the product of instruction and practice” (Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001, p. 36).

Real Spelling meets this goal by showing teachers how the English orthography is determined by the interrelated elements of morphology, etymology and phonology. My emphasis on morphological instruction in this paper should *not* be taken to diminish the importance of accurate, explicit and systematic phonological (or etymological) instruction. Also, my morphological focus *does not* represent the scope of the instruction supported by Real Spelling. Building on the orthographic model emphasized by Ramsden (2001) I have suggested an “analogy of triangulation” as a way of framing instruction aimed at developing an *understanding* of spelling as a tool for gaining meaning from words. “Triangulation is the standard method used by surveyors to pinpoint the exact location of a target by making connections to three reference points whose locations are known. We can look at spelling in a similar way. The spelling of a word (the target to pinpoint) is something that we can only confidently understand (not simply memorize) by applying knowledge from the three orthographic reference points: morphology, etymology and phonology” (Bowers, 2003).

Consider some examples of how teachers can “triangulate” these elements during instruction. On one hand, teachers need to provide detailed information on which graphemes are available to represent which phonemes. However, to *understand* a spelling, it is not enough to know which graphemes are “possible” (phonological reference point). One must also be able to explain why a *specific* grapheme is most appropriate for a given word. To answer this question, morphology and etymology offer the required additional reference points.

Imagine a class looking at the spelling of the word <mean>, as in “That is what I *mean*.” Students quickly learn that the <m> and <n> graphemes are the most likely choices for the first and last phonemes (/m/ and /n/), but the correct grapheme for the ‘long e’ phoneme is less obvious. Two likely choices are the digraphs <ee> and <ea>. Since the spellings <mean> and <*meen> are phonologically possible, how can we *understand* which is correct? One strategy our class learned was to look for words of similar meanings and spellings for clues. In this case the word <meant> provides the answer. Phonological instruction shows us that while the <ee> grapheme can only represent the ‘long e’ phoneme, <ea> can represent both the ‘long e’ and the ‘short e’. The limited

phonological representation of the <ee> grapheme could not be used in the meaningfully related word <meant> which is pronounced with the ‘short e’. Thus <ea> is used for words of connected meaning. The phonologically elastic <ea> digraph is also needed to link <real> with <reality>, while <reel> can use <ee> since its derivations all use the ‘long e’ phoneme. Looking for spelling/meaning cues at between words is a way of learning from ‘synchronic etymology’. “The word *synchronic* has the base element <chrone-> meaning ‘time’ with the prefix <syn-> meaning ‘together, parallel’. *Synchronic*, then, means ‘present or happening at the same time’.... Synchronic etymology looks at what links words that are in use and exist side by side in the language as it is today (Ramsden, 2001, p. 143). Diachronic etymology is the more familiar aspect of etymology that deals with what word origins (e.g., Latin and Greek Roots) can tell us about spellings and meanings.

(On a side note, our class thought we found an exception to the static phonological representation for the <ee> grapheme in the word <been> which is not always pronounced with a ‘long e’. We then realized that the morphological structure <be+en> meant that <ee> could not be a grapheme in this word, as graphemes cannot straddle morphemic boundaries. Inquiries sparked by a hunt for a ‘true exception’ are equally educative whether or not the initial hypothesis shown to be correct.)

Teaching the interrelated nature of orthography moves beyond phonological instruction that shows which graphemes are possible; it shows which are correct and *why*. Consider how this “triangular” model of instruction informs in the sample of words below. I have indicated etymological cues in bold, and underlined morphological connections in the word groups. The structure of morphologically complex words is shown in word sums.

<u>nature</u> , <u>natural</u> , <u>innate</u>	<u>origin</u> , <u>original</u> , <u>originate</u>	there , here , where	two , twice , between
nate/+ure → nature	origin+al → original		
nate/+ure/+al → natural	origin+ate → originate		
in+nate → innate			

Note that both the <a> and <o> in the word <original> represent the neutral vowel phoneme (shewa) that can be represented by any vowel letter. Pronunciations of the related words <origin> and <originate> indicate which vowel letters <original> must use. The words indicating location are linked by the <here> letter string, which distinguishes the homophones <there>, <their>. The words connected to the number ‘2’ use the <tw> letter string. The <w> in the word <two> is an etymological marker cuing similar words where that grapheme is pronounced. This etymological instruction helps students learn to distinguish the homophones <two>, <too> and <to>. The “Word Searcher” on Neil Ramsden’s “Spelling Micro-Site” is a useful on-line tool that students and teachers can use to investigate orthographic patterns and test hypotheses. It can be found for free at <http://www.neilramsden.co.uk/spelling>.

This is an admittedly brief introduction of how the “triangulated” model of orthographic instruction reflects the interrelated nature of morphology, etymology and phonology. I have included it in part to ensure that the reader understands that the Real Spelling resource that I have drawn so heavily from is explicitly designed to support teachers with instruction of all three elements of orthography and how they interact. It provides a much more comprehensive understanding of English orthography as an ordered system for representing meaning, and support for teaching it than is possible here. I view the morphological instruction emphasized here as *one* particularly productive and engaging aspect of comprehensive literacy instruction that children deserve but rarely receive.

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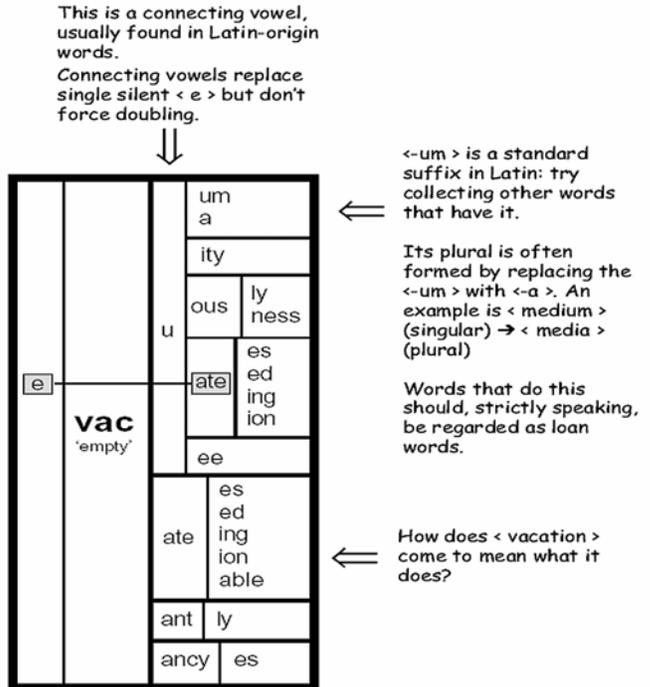
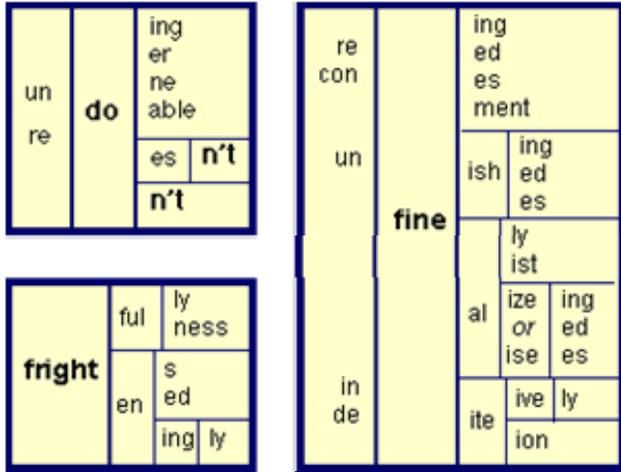
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Appendix 1:

Examples of instructional tools from Real Spelling (Ramsden, 2001) supporting instruction of the morphological structure of English Orthography

The Word Matrix



Using a morphological matrix:

- Read from left to right.
- Make only single, complete words from a matrix.
- If you are not sure that a word you build from a matrix is a real word, then check to see if it is in your dictionary.
- You may use only one element from a column at a time.
- 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! – You must be on the lookout for spelling patterns when you make a word from a matrix (consult Big Suffix Checker Appendix 2).

The Flow Chart

Orthographical patterns follow systematic processes and one way of consolidating them is to reformulate them as a flow chart.

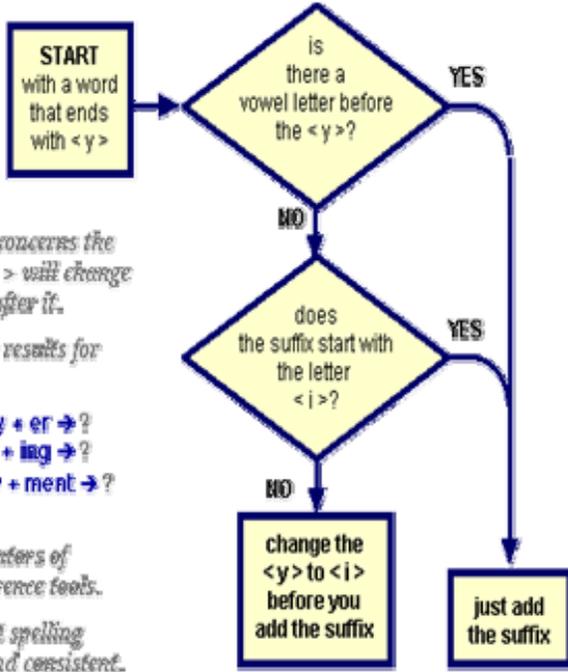
Here is a very simple example. It concerns the pattern that decides whether a <y> will change to an <i> when you put a suffix after it.

Try using it yourself to produce the results for these ‘word sums’.

- try + ed → ?
- happy + er → ?
- fury + ous → ?
- reply + ing → ?
- play + ed → ?
- merry + ment → ?

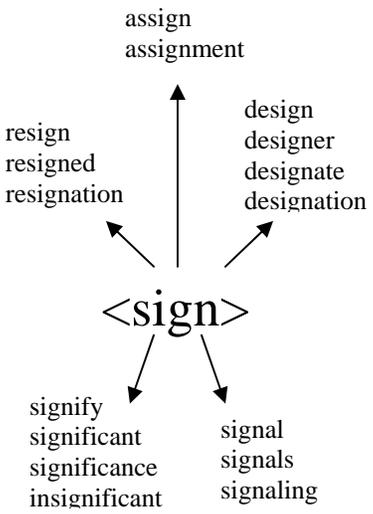
Flow charts are excellent consolidators of learning as well as convenient reference tools.

They confirm for your students that spelling processes are largely predictable and consistent.



The Word Web

Constructing Word Webs is an effective vocabulary building activity. It also emphasizes the spelling / meaning connection regardless of pronunciation. Word Webs can add a meaningful layer to the classroom ‘Word Wall’.



Appendix 3: Example Structured Inquiry Lesson

Activity Page # 7 <i>/<y> Spelling Pattern Hunt

We have learned that adding a suffix or a base to a word stem ending in the letter <y>, changes the <y> to <i> unless there is a good reason to keep the <y> inside the new word – and there are only three good reasons to keep a <y> inside a word. The word matrices below can be used to find examples of each of the **three good reasons**. We have already discovered [to] two of them:

- 1) If changing a <y> to <i> forces an <i+i> letter string, keep the <y> and add the suffix.

Example: cry/i+ing → (*criing→) crying

- 2) If the letter before the <y> is a vowel letter, keep the <y> and add the suffix.

Example: stay+s → stays

There are more examples for both of these conventions among the word matrices below. Most of the words that can be built from the matrices do force the <y>/<i> shift, but there are also a number of examples of the third good reason to keep the <y> inside the new word.

Your goal: Work through word sums from the matrices provided to develop evidence for your theory of the third good reason.

Jobs to help you get there:

- 1) Title the next page in your notebook: “Rough Work For <y>/<i> Pattern Hunt”. You can use your flow charts to help you as you work out word sums from the matrices.
- 2) Study the matrices to make word sums on your rough work page. Look for word sums that match the categories on the page “Word Building: Three Good Reasons to Keep a <y> Inside a Word”. Rewrite word sums according to the instructions in the spaces provided.
- 3) You will find words where the <y> stays inside the word, but that do not follow either of the two patterns described. Write those word sums in the category marked “Mystery Pattern”. Once you find three word sums like this, you can write your hypothesis for the third pattern.

Challenge Work: Build more word sums from the matrices provided, or make word sums or your own word matrix with bases ending in <y>.

cry	ed	baby	busy	ly	body	family	man		
	es			er			es	ar	ity
ing	est	ize		ing					
ness	like	or		ed					
over	stay	s	man	ise	ate + ion	al	re	marry	ed
ed	ing	woman	inter	un	es				
fury			re	play	s	carry	ing	age	
joy	ous	ly			ed				
victory					mate				

Appendix 3 Continued...

Word Building: Three Good Reasons to Keep a <y> Inside a Word

Write 10 word sums where the <y> changes to <i> during word building. (Build at least one word sum from each of the six matrices)

1) _____

6) _____

2) _____

7) _____

3) _____

8) _____

4) _____

9) _____

5) _____

10) _____

Three words where the <y> does not change to <i> to avoid an <i+i> combination
(Use **3 different bases**)

1) _____

2) _____

3) _____

Three words where the <y> does not change to <i> because the <y+vowel> grapheme is an unalterable combination:
(Use **3 different bases**)

1) _____

2) _____

3) _____

Mystery Pattern! Three words where the <y> does not change to <i>, but that *do not* follow the first two good reasons
(Use **3 different bases**)

1) _____

2) _____

3) _____

Your hypothesis!
