Building the Foundations of Literacy:
The Importance of Vocabulary and Spelling Development

by Shane Templeton and John J. Pikulski

One of the best established relationships in the field of literacy is that between students' vocabulary knowledge and their reading comprehension (Anderson & Freebody, 1981; Stanovich, 1992). While this is not a simple cause-effect relationship, such that the teaching of many vocabulary words causes students to be better readers and writers, we **have** learned enough to be able to make some clear instructional recommendations. We understand better how to develop vocabulary for **reading**, for communicating **orally**, and for communicating through **writing**. More recently, we have come to understand the critical role that spelling knowledge plays in the language arts. Recent research has revealed that spelling knowledge is not only an important tool for **writing**, but that it also plays important roles in students' **vocabulary development, reading comprehension**, and **reading rate and fluency** (Perfetti, 1985; Templeton & Bear, 1992). In this paper, we will examine the instructional implications of the recent research in these two critical components of literacy vocabulary and spelling development.

Vocabulary Development

Based on a convincing body of research, we know that effective vocabulary instruction includes three major components (Mezynski, 1983; Stahl & Fairbanks, 1986):

- **Wide reading** that is enhanced through teaching **independent word learning strategies**, **morphology** or word structure, and **dictionary** use
- Direct instruction
- Building an interest in words

Underlying these three components is a fundamental relationship between words and the concepts they represent. Before exploring each of these instructional components, therefore, let's take a look at this relationship.

Relating Words and Concepts

Effective vocabulary instruction develops the relationship between words and concepts. **Concepts** are the basic units of thought and belief (Smith, 1995), and **words** are the labels for these thoughts and beliefs. If a concept is a familiar one, then the word that corresponds to this underlying knowledge will be understood, remembered, and used. Concepts grow and develop through experiences and through **examining** those experiences, concretely and through reading and writing. This in turn leads to learning and using more labels — words. The strong relationship between vocabulary knowledge and reading comprehension exists because to their reading.

Vocabulary knowledge grows in the following four ways:

> **1. Elaborating conceptual knowledge underlying a known word.** For example, a student learns that the word **cat** can refer not only to the familiar "garden-variety" family pet but to a family of wild animals, some of them quite large.

2. Relating new words to existing concepts. A new word, **gigantic**, is related to the familiar word/concept of **huge;** unfamiliar **automobile** is related to the familiar **car.**

3. Relating new concepts to existing words. A student who knows what a **column** of numbers means in arithmetic learns that **column** also refers to a type of article in a newspaper.

4. Learning both new words and new concepts. This involves helping students develop a concept for the process of **condensation** and helping them learn and remember the corresponding new word.

The depth and the form of our instruction will vary with each of these. A brief explanation may be sufficient for relating a new word to an existing concept, while richer, deeper instructional experiences are required for developing new concepts that underlie new words. In fact, researchers have pointed out that words can be understood **superficially** or **deeply** (Graves, 1994). When a word is understood **superficially**, the underlying concept is not elaborated and there are few connections with other related concepts. In contrast, **deep** knowledge is richly elaborated and connected with many other concepts.

We know much about preschool children's learning of concepts and words in an oral language environment, and we know that overall vocabulary growth in school-age children is phenomenal — Nagy and Anderson (1984) estimate the rate at 3,000 words per year. This dramatic growth in school-age students occurs as a result of both wide reading and direct instruction (Beck & McKeown, 1991; Pikulski 1991). Let's now examine the role that each of these, together with developing an interest in words, plays in vocabulary development.

Wide Reading and Independent Learning Strategies

The importance of wide reading in the growth of students' vocabulary is critical (Nagy & Anderson, 1984; Nagy, 1988). Scott and Nagy (1994) summarize: ". . . to promote the goal of learning a large number of different words, independent reading should be encouraged as a regular and significant part of each school day." In addition to all of the other values and skill development that can occur as a result of wide and independent reading, students come in contact with vocabulary that rarely occurs in spoken language but which is much more frequent in printed language. These include, for example, words like **serenity, contaminate, stabilize, phenomenon,** and **anxiety.** These are words that are "necessary to make critical distinctions in the physical and social world in which we live" (Stanovich, 1992, p. 216) and which help students develop sensitivity to the subtleties in language and thought (Olson, 1986). This is certainly true for students in grades four and up, but as students in the elementary grades read and explore rich, authentic literature, they will encounter challenging vocabulary in texts at the primary grades.

While wide reading is absolutely essential for vocabulary growth and development, for most students it is not sufficient (Chaffin, 1997; Zechmeister, Chronis, Cull, D'Anna, & Healy, 1995). The meaning that students construct as they read and the understandings they take away from their reading will not be deep and long-lasting **unless** students are taught the knowledge and strategies needed for learning new words through independent reading. Since most students do not develop these independent learning strategies on their own, instruction in independent learning strategies is critical. Simply put, if we want our students to become independent word learners, then we must model how to think about new words that they encounter in their reading. There are four types of knowledge and strategies that enable students to become independent word learners:

- **morphological** knowledge
- effective use of **contextual clues**
- the application of morphological and contextual knowledge in a **word-learning strategy**
- the role of **dictionaries** and other word reference books

Morphological Knowledge

Researchers have suggested that students' ability to determine the meaning of new words while reading draws significantly on their knowledge of the structural aspects of words (Scott & Nagy, 1994; Sternberg & Powell, 1983; Wysocki & Jenkins, 1987). Linguists refer to this type of knowledge as **morphological** knowledge because it is based on an understanding of **morphemes**, the smallest units of **meaning** in a language. Morphemes can be individual words that have meaning on their own, such as **horse** and **room;** they can also be **word parts** that do not have meanings on their own but change and extend the meaning of words to which they are added, such as prefixes (**un-, re-, dis-)** or suffixes such as **-ful** and **-ness.** Morphological knowledge is critical when students encounter lessfrequent words in their reading (Coady, 1994; Just & Carpenter, 1987). Aronoff (1994) observed that "Once past the early elementary grades, most new words encountered in reading are morphological derivatives of familiar words. A reader who has a good intuitive command of morphology will be able to understand these words with little or no conscious effort, especially in written context" (pp. 820-821).

How do students get to be readers who have a "good intuitive command" of morphology? They will need to learn the following:

- specific morphemic elements -- prefixes, suffixes, and word roots (Baumann & Kameenui, 1991); and
- the processes by which these morphemic elements combine (Wysocki & Jenkins, 1987)

Students can begin their exploration of morphemic elements with simple prefixes, suffixes, and base words. Later, frequently occurring Greek and Latin word roots can be explored (Nagy, Diadikoy, & Anderson, 1993; Templeton, 1989). These include, for example, **chron** ("time," as in **chronology**), **tele** ("distant, far," as in **television**), **dict** ("say," as in **dictation**), and **fract** ("break," as in **fracture**). A large proportion of the vocabulary of specific content areas is built on Greek and Latin elements, so students' knowledge of the most commonly-occurring examples will provide them with valuable prior knowledge for learning new concepts and terms. Following is an example of how a teacher would guide students toward understanding how roots function:

> The teacher writes the words **depend** and **suspend** on the board and asks students what the words have in common (the letters **p-e-n-d).** The teacher then explains that **pend** is a word root -- and like a base word, prefix, or suffix, a word root has meaning and affects the meaning of the word that it's in. Explaining that the root **pend** comes from Latin and means "to hang," the meanings of **depend** and **suspend** are discussed in terms of how they are related to the meaning of **pend.** (To **depend** on something is to rely on it, or hang onto it. To **suspend** something is to hang it.)
>
> Next, the students work in small groups or pairs to determine how each of the following phrases relates to "hanging": **a diamond** pendant; **hands**, **feet**, and other **appendages**; a clock's **pendulum;** a book's appendix.

As we'll discuss later, **spelling** plays an important role in facilitating morphemic knowledge. In fact, in the upper elementary grades and beyond, spelling and vocabulary instruction can advance hand-in-hand (Templeton, 1979, 1989).

Knowledge of Contextual Clues

Teachers play a critical role in modeling how contextual clues support learning of new words (White, Power, &

White, 1989), as the following examples illustrate: After students have read Lynn Cherry's **The Great Kapok Tree**, the teacher has them reread the following sentence:

> **And in this steamy environment the great Kapok tree shoots up through the forest and emerges above the canopy.**

The teacher then engages in a "think aloud" to illustrate how context can be used to determine the meaning of the unfamiliar word **emerges**:

> "The word **emerges** seems important to the story because it tells what the Kapok tree does. The phrases **shoots up** and **above the canopy** are context clues; they suggest that **emerges** means 'comes out of.'"
> **(Grade 4 Teacher's Book, p. 629E)**

After students understand the potential of context to help in determining possible meanings of unknown words, they can explore the different types of contextual clues. To illustrate, the following is an example based on Caroline Arnold's **Trapped in Tar: Fossils from the Ice Age,** in which important types are explored:

> **General context:** "An ice and land bridge connected Asia and North America. Both people and animals **migrated** across this bridge." The word **migrated** can be explained by thinking about the more general context of these two sentences: Thinking about the "bridge connecting" and "people and animals 'migrated' across" suggests that **migrated** means something like '**moved**' or '**went**.'"
>
> **Definition:** "Then great sheets of ice, called **glaciers**, covered much of the Northern Hemisphere"; "When the oil evaporates, it leaves pools of **asphalt**, or tar."
>
> **Series:** "...mammoths, **mastodons**, sabertooth cats, lions, wolves, sloths, camels, horses, and many other animals..."
>
> **Contrast:** "The climate was mild, and food and water were plentiful. When the ice Age ended about 10,000 years ago, the climate changed. Most of the lakes and streams dried up, and food became **scarce**."

While it is important that students become aware of the potential of context to support figuring out new words, it is also important that they realize its limitations. Most often, the use of context alone as a strategy for figuring out new words will not lead to the precise meaning of words. On the other hand, context **combined with** morphemic analysis is a much more effective strategy, as this example illustrates (Templeton, 1995):

> As the teacher displays the following passage she comments to the students, "Let's see how context and what we know about the structure of words can help us with two new words in this passage":
>
> > **Every fish, reptile, amphibian, bird, and mammal has a row of bones in its back, usually called the spine or spinal column. This is the feature that groups them together as vertebrates (animals with backbones or vertebrae), distinguishing them from invertebrates such as insects and worms.** (Parker, 1988, p. 40)
>
> Pointing to **vertebrates**, the teacher explains, "This passage tells us what one of our unknown words is. It says that vertebrates are living things that have a backbone. But what about **this** word [pointing to **invertebrates**]? The passage gives us examples of invertebrates — insects and worms. But what is it about insects and worms that makes them very different from vertebrates? The passage doesn't tell us; but because we know that **vertebrate** means 'having a backbone,' what about an **invertebrate**? Is there a clue in the structure of the word?

Yes, there is a prefix, **in-**, and it often means 'not'; so if we try out the meaning of 'not having a backbone' in the sentence, this meaning would fit — insects and worms don't have backbones."

Word Learning Strategy

An effective strategy for learning words from independent reading pulls together students' developing morphological and contextual knowledge as well as their knowledge of words in general. It includes determining **which** new words should be analyzed in light of the students' reading purposes and the nature of the selection they are reading — how important **is** a particular unknown word? We encourage students first to ask themselves this question when they encounter an unfamiliar word in print: "Is this word important to my understanding of what I am reading?" If the answer is no, then they can continue reading provided that their comprehension remains intact. If the answer is yes, they should follow these steps:

- Try to pronounce the word.
- Think of other words that remind you of this one.
- Look for familiar prefixes, base words, roots, or suffixes.
- Look for context clues.
- Use a dictionary.

Often, when students pronounce a word, they realize they do in fact know it — it is in their speaking/listening vocabulary but not yet in their reading vocabulary. In the intermediate grades, however, more often than not such a word is entirely new to the student — pronunciation is, therefore, not a guide to unlocking the meaning of the word. A good second step is to think of words that might be structurally related to the unknown word or that contain some of the same structural elements. Looking for morphemic or structural clues is important — the meaning of prefixes, suffixes, and base or root can be combined to suggest a possible meaning. Thinking of contextual clues can provide a general idea of the word's meaning but is much more effective when combined with morphemic analysis. If the word is still unknown, however, then the dictionary will be the final guide.

Each of these steps needs to be modeled and taught. Eventually, students can internalize the steps in this strategy. Application of these steps then becomes much smoother. In fact good readers usually "blend" these steps — they are sounding out, analyzing structure, and looking for context, almost simultaneously (Rayner & Pollatsek, 1995).

The Role of the Dictionary

In recent years, the role of the dictionary in learning new words has been de- emphasized. This may be in part because dictionaries seem to connote a more traditional, "dry" feel (Nist & Olcjnik, 1995) — probably because they have so often been **mis**used. It is **how** we use the dictionary rather than the dictionary itself that determines how useful it can be for vocabulary development. Dictionary entries can be one important and effective component of understanding a word **deeply.** The entries can also help students determine the precise meaning of a word they need to know in their reading — the last step in the "Word Learning" strategy.

For example, based on Robyn Montana Turner's biography of Faith Ringgold, teachers can model a situation in which the steps in determining the meaning of an unknown word require the use of the dictionary. Instruction would focus on the word **enhancing** in the sentence "Faith Ringgold decided to use cloth frames as a way of **enhancing** her art. Pronouncing the word does not seem to help, because it is not in the students' speaking/listening vocabularies. Thinking about the context in which the word occurs may narrow the possibilities somewhat — but possible meanings might include, for example, "protecting" or "showing."

Morphemic analysis may help in identifying the prefix and suffix, but that's as far as students will be able to go with this level of analysis. This is definitely a situation in which the dictionary would be called upon.

The teacher would underline the word **enhancing** and explain that to check the meaning of this word in the dictionary, students would need to look up the base word, **enhance**, noting that the **e** is dropped when the **-ing** is added. This underscores the point that students may need to watch out for changes in spelling when they are trying to figure out the base word for an unfamiliar word. Looking up a base word will also show the students how to spell other forms of the word.

The dictionary definition is "to make greater, as in value, beauty, or reputation." The teacher now has the students return to the sentence in the text and discuss which of these features they believe Faith Ringgold had in mind when she decided to use cloth frames. Now, in the overall context of the text and the specific sentence, it becomes clear that Ringgold probably wanted to make her quilts more **beautiful.**

Dictionaries can also provide helpful information about the history of a word and reinforce the interrelationships among words in the same meaning "families." For example, a discussion of "run-on entries" illustrates how one word's entry can include information about related words — the entry for **entrap** also includes **entraps** and **entrapment.** The usage notes in dictionaries often explain subtle but important differences among words — usually the appropriateness of one word over another in a particular context. Dictionaries can also contribute to an interest in and attitudes toward words that teachers and the students explore, a topic we'll discuss below.

Directly Teaching Word Meanings

Directly teaching specific words and their meanings, the second component of effective vocabulary instruction, is also important. Direct instruction involves determining **which** words should be taught, **how** they are taught, and **when** they are taught. Let's examine each of these aspects more closely.

Which Words Should Be Taught?

In the elementary grades, our primary focus is on words that occur in the specific selections that students are reading as well as words that represent significant concepts in each of the various curriculum areas. When teachers are planning to engage students in reading a particular story or informational text, they must examine the text to determine if there are challenging words that are crucial to students' understanding and appreciation of the selection; if there are, then these words should be directly taught.

For example, before reading **A Chair for My Mother** by Vera Williams, a primary-grade teacher determines that two words, **tips** and **savings**, are probably not familiar to her students and that they are central to understanding the story. She introduces each word in a sentence and the students discuss their possible meanings. At the intermediate level, a teacher is getting ready to engage her students in reading Russell Freedman's **The Wright Brothers: How They Invented the Airplane.** She has determined that she will need to develop her students' knowledge for five words: **calculation**, **data**, **systematic**, **accuracy**, and **stabilize**; not only will understanding these words facilitate comprehension during reading, but these words represent important concepts for the content area of **science** as well. First, she displays a transparency on which she has written a short description of the steps involved in creating an invention. She has left a space for each of the words. She then engages the students in a discussion about which word they think will be most appropriate in each space.

It is also important to model for students when an unfamiliar word may be skipped over. In **The Wright Brothers: How They Invented the Airplane**, the teacher directs students' attention to the following sentence: "Using tin shears, hammers, files, and a soldering iron, the brothers fashioned as many as two hundred miniature wings out of tin, galvanized iron, steel, solder, and wax." The students are unfamiliar with the word **galvanized**, so the teacher discusses with them that they can determine it has to do with a particular type of iron but that it's really not necessary to analyze this word or look it up in the dictionary; the word occurs as part of a list of materials the Wright brothers used to make wings, and that's what the emphasis in this passage is on. In another context this word may be quite important, and students may be interested in looking it up on their own, but in this particular passage it's not a word that the students need to know to continue to understand and enjoy the selection.

How Should the Words Be Taught?

Remember our discussion of "superficial" and "deep" word learning? **How** words are taught depends on teachers' and students' purposes, so when we wish to teach specific target words we should think about which new words students should learn **superficially** and which they should learn **deeply**.

If a **superficial** understanding is all that is required, then a quick explanation of the word's meaning in the context in which it occurs is usually sufficient. For example, while reading Betsy Byars's **The Midnight Fox**, a teacher realizes that students are confused about the phrase **rounded the bend**, she explains briefly what the word **rounded** means in this phrase.

Deeper understanding of a word, which is especially important when teaching new concepts, requires the following (Mezynski, 1983; Stahl & Fairbanks, 1986; Scott & Nagy, 1994):

- Determining what students may already know about the word
- Providing students with several exposures to the new word
- Providing a significant amount of information about each word, including **definitional** information and how the word is used in context
- Providing activities that provide deeper processing of the concepts underlying new words.

We can most effectively determine what students already know about a word through discussion (Beck & McKeown, 1991; Stahl & Vancil, 1986). Discussion is one of the most powerful ways in which teachers can initiate and engage students in the exploration and development of new word meanings. In the reality of the classroom, these practices will usually overlap — through discussion, reading, and writing, students will inevitably have several exposures to a new word. Teachers should explore the definitions of the new words in these several contexts and plan for a variety of activities.

Many studies lead to the conclusion that "instruction that requires the learner to actively generate information improves retention because it helps to build semantic network connections between new and prior information" (Beck & McKeown, 1991, p. 806). This is why it's important that teachers engage students in examining words from a variety of perspectives. The semantic connections that are built in turn impact reading comprehension because they potentially access most if not all of the different types of contexts in which words may be used — as opposed to **superficial** learning in which one definition, for example, may be all that is learned.

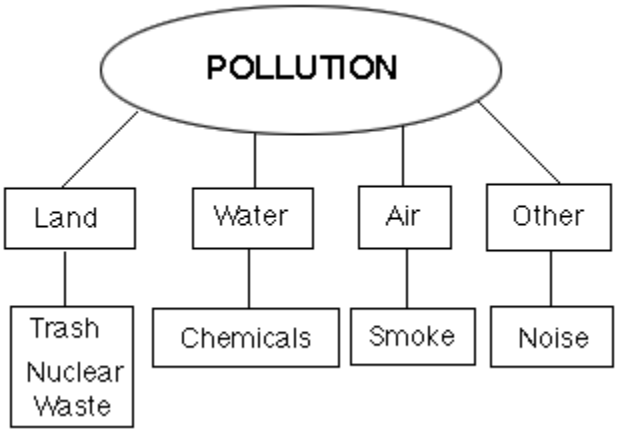
Effective activities enrich students' connections among concepts at the same time as they elaborate the concept underlying an important word. Activities that ensure students build semantic connections include using **graphic aids** (Schwartz & Raphael, 1985; Stahl & Vancil, 1986) such as charts, semantic webs, concept maps, and word webs. They also involve categorization activities as well as encouraging students to use new words as often and as appropriately as they can in their writing.

Teaching Vocabulary Before Reading

Trying to teach all the new words in a selection prior to the students' reading is rarely necessary or effective. However, as we've seen, it is necessary to identify **which** new words probably require attention prior to reading.

As a rule, new words in **narrative** selections are not as critical to the overall understanding of the selection as are new words in **informational** selections. Before guiding students' reading of a particular narrative, teachers should determine if there are any new words that represent concepts that are critical to understanding the selection and which are not adequately defined in context. If there are, then these words should be presented and discussed before the students read. While a "narrow" or superficial treatment often is sufficient for these, on other occasions it is necessary to develop "deep" understandings.

For example, before reading Chris Van Allsburg's **Just a Dream,** the underlying concept for the word **pollution** can be developed through categorization in a chart format. The teacher may believe that the Students have a general concept underlying the word but that they need to reflect on specific types and examples of pollution. To engage the students in this type of discussion and reflection, the following chart can be displayed, and as students look through the book and examine the pictures, they can discuss examples of how land, water, and air may all be polluted:



(Grade 4 Teacher's Book, p. 195C)

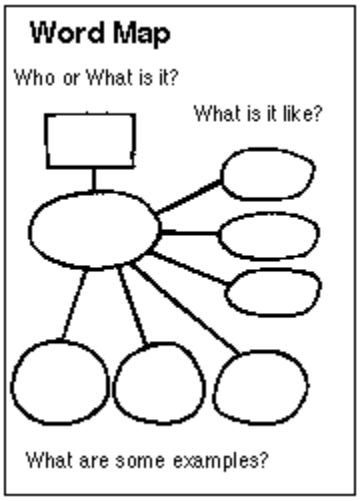
Informational selections usually carry a higher load of new words than narratives, and the meanings of these new words are quite often important for efficient understanding of the selection. If new words are defined appropriately in the selection — through definition, example, explanation — they may not need to be discussed beforehand (see **Knowledge of Contextual Clues**). On the other hand, new words that are critical to an understanding of the major topic or theme should be introduced and discussed prior to reading, because the exploration of these prerequisite terms/concepts will establish a strong foundation for subsequent learning.

For example, in order to determine what third-grade students know about several important terms in Judy Donnelly's **The Titanic: Lost . . . and Found,** the teacher could make a chart in which the words would be classified into one of three categories:

Where Passengers Are	**Whom Captain Gives Orders To**	**What Might Be Used to Rescue**
compartments	operators	lifeboats
decks	seaman	lifejackets
on board	lookout	radio

This type of categorization or **word sort** also facilitates students' sensitivity to thinking about words in terms of their semantic relationships to one another (Bear, Invernizzi, & Templeton, 1996; Cunningham, 1995). This sensitivity is important because it will serve students well when they are reading independently and need to determine the meaning of an unknown word.

To elaborate on the concepts underlying the word **tomb** in **Into the Mummy's Tomb,** the teacher presents **a concept map** in which the definition, examples, and features of a tomb are graphically arrayed:



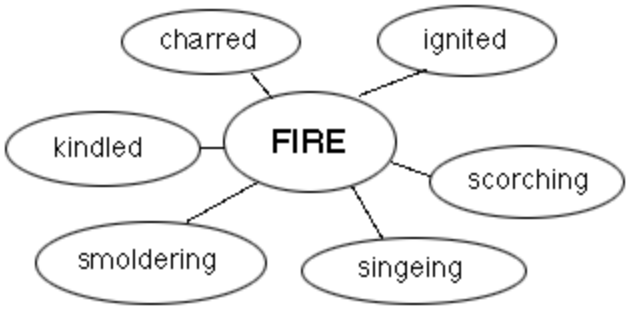
Teaching Vocabulary After Reading

Working with vocabulary building after students have read a selection allows teachers the opportunity to reinforce important new words that were introduced prior to the reading as well as to focus on words that were met during the reading.

For example, a teacher uses the word **smog**, which occurs in Chris Van Allsburg's **Just a Dream**, to help students understand both the **origin** of the word and the **process** that creates such words:

> After writing **smog** on the board, the teacher explains that one way of creating new words is to blend together words that already exist. She asks the students if they can think of the words that were blended to form **smog** (**smoke** and **fog**). Other "blended words" are then discussed — **brunch** (**breakfast** and **lunch**), **motel** (**motor hotel**), and **squiggle** (**squirm** and **wriggle**).

After reading **The Great Yellowstone Fire** by Carole Vogel and Kathryn Goldner, words that were introduced prior to the reading are reinforced through a semantic web — to which additional fire-related words can be added, such as **backfires**, **blacken**, **embers**, **firebreak**, **simmer**, **smother**, **torch**, and so forth — and the writing of a "diamante," a diamond-shaped poem:



Example: Semantic Web for "Fire"
(Grade 4 Teacher's Book, p. 143G)

spark
glows hot
bursts into flame
pops, crackles, hisses, roars
throughout the night
ashes smolder
smoke

Example: Writing Diamond-Pattern Poem
Using "Fiery Words" (Grade 4, p. 143G)

Discussions of **connotation** are very effective after reading as well. Students come to understand the difference between the **denotative** meaning of a word, or its literal meaning, and its often broader **connotative** meaning — the associations we have when we hear or see the word.

For example, in Seymour Simon's **Wolves**, the word **sly** is used to describe how some people think about wolves. While the denotative meaning of **sly** is "cunning," the word has a negative connotation: We think of wolves being mischievous, trying to trick people and other animals. Such discussion helps students learn about the appropriateness of words and how to understand more words precisely that occur in their reading and how to use them in writing with more precision and effectiveness.

After reading **Along The Santa Fe** rail, written by Maria Russell and adapted by Ginger Wadsworth, a teacher asks students to look back to the sentence containing the phrase ". . .small lagoons of rainwater like turquoise beads strung on a dark-brown string." She explains to the students that when traders first brought the beautiful blue-green stone to Europe, the French called it **pierre turquoise**, or "Turkish stone." Students then follow up by tracing the origin of some other words in the selection, such as **tarantula** (from Italy; it means "large spider") and **hamburger** (from Hamburg, Germany).

Developing an Interest in Words

We've seen the importance of teachers modeling how words work, teaching strategies for learning new words, and teaching specific words that are important for students to know.

It is equally important to foster a type of word learning environment that promotes inquisitiveness, interest, and wordplay. Teachers can discuss "word nuances, variations, and relationships — connotations and connections — so that students actively use this enriched knowledge of words while developing and enhancing an attitude of

genuine interest in words" (Templeton, 1995, p. 379). Teachers can display their own interest in and enthusiasm for words by sharing new words they've run across and how they've thought about them, and by modeling interesting language and word use through reading to students at all grade levels. By being such "wordsmiths" themselves, teachers are more likely to create student wordsmiths who are also curious and inquisitive about words in school as well as out (Templeton, 1991). In fact, instruction that includes attention to words outside the classroom environment has been shown to be extremely effective (Duin & Graves, 1987, 1988; McKeown, Beck, Omanson, & Pople, 1985).

An important part of developing an interest in words includes sharing interesting stories about where words come from and how their meanings have evolved (Scott & Nagy, 1994). For example, during the reading of Edith Kunhardt's **Pompeii . . . Buried Alive**!, the origin of the word **volcano** can be explained:

> "The word **volcano** came from an ancient Roman myth about a god named Vulcan. Vulcan was the god of metal working and lived in a cave under a mountain. When the people of ancient Rome saw mountains erupting with fire and smoke, they believed Vulcan to be the cause. The eruptions were caused by the fiery furnace in his cave."

While so many words have their origins in myths and legends, many other words have more recent origins. As we've already pointed out, **blended words** are one such type. Other words, particularly in the various sciences, have been created by combining Greek and Latin elements. Many words that seem "old-fashioned" are often used by writers who wish to create a setting and mood that characterizes a time now gone, and it's often delightful for students to compare and contrast "then and now." For example, students can explore Marjorie Stover's **Patrick and the Great Molasses Explosion** for "old-fashioned" words and contrast them with contemporary words that represent similar concepts or situations.

"Old" Word	**Meaning**	**New Words**
buggies	carriages pulled by horses	car, automobile
stable	a building for horses	garage, parking lot
cobblestones	stones used for paving streets	pavement, asphalt
washtub	a metal tub for washing clothes or bathing	bathtub, washing machine
porridge	a soft food made of cooked grains	hot cereal, oatmeal

(Grade 3 Teacher's Book, p. 3051)

As students continue to explore and think about words, they can be encouraged to keep **Vocabulary Notebooks** in which they jot down interesting words they come across in their reading (Bear, Invernizzi, & Templeton, 1996). As they become comfortable with this technique, they can add information to each word as appropriate — the sentence in which it occurred so they gain a sense of the context in which it's used, its word parts and their meaning, and the appropriate dictionary definition and example sentence.

Students' interest and curiosity about words are stimulated when they learn the logic behind word origins and the many stories that underlie how words came about and came to mean what they do. This knowledge also lays down a solid bedrock for lifelong vocabulary learning. And it's also important to realize that learning these aspects about words reveals that words are not only **interesting** — words are also **fun**! For example, most intermediate students love the "Sniglets" books by Rich Hall, particularly when they are learning about Greek and Latin word parts. A sniglet is "any word that doesn't appear in the dictionary, but should." Reading about Hall's sniglets, and then writing their own, gets students to interconnect concepts in new ways. This type of word play also reinforces awareness and understanding of morphemic analysis and the processes of how words come about: word creation. Here are just a few examples (Hall, 1984):

> **rovalert** (**rov'**al urt): The system whereby one dog can quickly establish an entire neighborhood network of barking. (p. 69)
>
> **memnants** (**mem'**nents): The chipped or broken 'm&m's" at the bottom of the bag.
>
> **detruncus** (de **trunk'**us): The embarrassing phenomenon of losing one's bathing shorts while diving into a swimming pool.

Books About Words

For Primary Students

Bunting, J. (1995). **My first action word book.** London: Dorling Kindersley.

Degen, B. (1983). **Jamberry.** New York: Harper & Row.

Ernest, L. C. (1996). **The letters are lost!** New York: Viking.

Farwell, C. (1998). **Word wizard.** New York: Clarion.

Maestro, G. (1989). **Riddle roundup: a wild bunch to beef up your word power.** New York: Clarion.

Merriam, E. (1993). **Quiet, please.** Illus. S. Hamanaka. New York: Simon & Schuster.

Most, B. (1991). **A dinosaur named after me.** San Diego: Harcourt.

Most, B. (1994). **Hippopotamus hunt.** San Diego: Harcourt.

Most, B. (1992). **There's an ant in Anthony.** New York: Morrow.

Schneider, R. M. (1995) **Add it**, **dip it**, **fix it**: **a book of verbs.** Boston: Houghton Mifflin.

Ziefert, H. (1997). **Baby buggy**, **buggy baby. a wordplay flap book.** Boston: Houghton Mifflin.

For Intermediate Students

Agee, J. (1994). **So many dynamos**! **and other palindromes.** New York: Farrar, Straus.

Asimov, I. (1961). **Words from the myths.** New York: NAL-Dutton.

Asimov, I. (1968). **Words from history.** New York: NAL-Dutton.

Cox, J. (1980). **Put your foot in your mouth and other silly sayings.** New York: Random House.

Fakih, K. (1994). **Off the clock: a lexicon of time words and expressions.** Boston: Houghton Mifflin.

Graham-Barber, L. (1995). **A chartreuse leotard in a magenta limousine: and other words named after people and places.** New York: Hyperion.

Grover, M. (1997) **Max's wacky taxi day.** San Diego: Harcourt.

Heller, R. (1992). **Cache of jewels and other collective nouns**. New York: Putnam.

Heller, R. (1997). **Mine**, **all mine! a book about pronouns**. New York: Putnam.

Juster, N. (1961). **The phantom tollbooth**. New York: Random House.

Juster, N. (1989). **A surfeit of similes**. New York: Morrow.

Klausner, I. (1990) **Talk about English**: **how words travel and change**. New York: Harper.

Terban, M, (1988). **Guppies in tuxedos**: **Funny eponyms**. New York: Clarion.

Terban, M. (1983). **In a pickle and other funny idioms**. New York: Clarion.

Terban, M. (1993). **It figures**! **fun figures of speech**. New York: Clarion.

Terban, M. (1987). **Mad as a wet hen**! **and other funny idiorns**. New York: Clarion.

Spelling Development

Just as we saw with vocabulary development, reading and writing are a critical foundation for spelling development as well, but they are not sufficient. More systematic exploration of the spelling of words is necessary for most students (Invernizzi, Abouzeid, and Gill, 1994).

Effective spelling instruction, therefore, addresses three objectives:

- Students learn the major **principles** and **patterns** of English spelling.
- Students learn reliable spelling **strategies** that they can apply to both familiar and unfamiliar words.
- Students become aware of the rich network of **spelling-meaning relationships** that can significantly extend their vocabulary.

Research has also demonstrated that learning to spell involves **generalizing** principles from specific words, rather than simply memorizing every word as an individual unit (Read & Hodges, 1982). Because emphasis is placed on learning principles and patterns rather than on simply learning individual words, it is important that words be grouped together according to a common feature such as **sound**, **spelling pattern**, **syllable pattern**, or **word part** (base, prefix, suffix). High-frequency words that do not follow predictable principles but that are important for writing should be included as well, though they should not be the sole focus of spelling instruction (Zutell, 1994).

The Nature of the Spelling System

Although English spelling is based on an alphabetic principle, it also works on other levels. There are three basic **layers** of information that spelling can represent: In addition to the **alphabetic** layer, there is a **pattern** layer and a **meaning** layer (Henderson & Templeton, 1986; Ehri, 1993):

- The **alphabetic** layer matches letters and sounds in a left-to-right fashion. For example, in the word **mat,** the letter-sound matchup is obvious: **m** = **/m/**, **a** = **/æ/**, **t** = **/t/**.
- The **pattern** layer provides information about sounds that a **group** of letters, or pattern, represents. For example, long vowels are usually represented by more than one letter — silent letters are involved — as in the **vowel-consonant-silent e** pattern in words like **rake** and **time**, and **vowel digraphs** as in **train** in which the second, silent vowel letter signals the pronunciation of the vowel.

  In contrast to the alphabetic layer, the pattern layer is more conceptually advanced because learners come to understand that spelling does not always work in a strictly left-to-right fashion. In order to understand how the "silent e" works in words such as **make**, for example, learners must skip to the end of the word and think in a right-to-left sequence.

  When letter patterns within single syllables are understood, learners come to understand **syllable** patterns. The two most common syllable patterns are the **vowel/consonant/consonant/vowel** (VCCV) pattern, as in **kitten** and **helmet**, and the **vowel/consonant/vowel** (VCV) pattern, as in **pilot** and **hotel:** The doubling of consonants at the juncture of syllables usually depends on the preceding vowel pattern — if it's short, then double; if it's long, do not double.

- The **meaning** layer reflects the consistent spelling of meaning elements, or **morphemes**, within words, despite sound change. For example, the spelling of the base in the following pairs of words is spelled consistently even though the sounds that the letters represent change: **define/definition**; **local/locality**; **sign/signature**. The spelling of word roots from Greek and Latin is also fairly consistent: Note the spelling **dict** ("speak") in **dictate** and **contradict** ("speak against"); **fract** ("break") in **fracture** (a break) and **infraction** (a "breaking into").

Developmental Levels of Spelling

Studies of students' writing and word knowledge reveal that learning to spell is a **developmental** process (Henderson, 1985; Templeton and Bear, 1992) and that students' understanding of how the spelling system works follows the alphabet-pattern-meaning sequence just described. Because students can learn the regularities of English spelling if instruction is paced to their development, we should help them move from what they know to what they are developmentally ready to learn. Understanding this developmental sequence enables us to provide appropriate, enjoyable, and systematic instruction. The table below provides an overview of the sequence of spelling instruction as a function of developmental level.

What Students Need to Explore at Each Developmental Phase

Letter Name	**Within-Word Pattern**
· Single Consonants	· Common long vowel patterns
· Consonant digraphs and clusters	· **r-** and **l-** influenced vowels
	· Common spelling for

· Short vowel patterns

diphthongs **/ow/**, **/oi/**

· Compound words

<u>Syllables & Affixes</u>

· Homophones

· Less-frequent vowel patterns

· Common inflections

· Sound and meaning of common prefixes and suffixes

<u>Derivational Patterns</u>

· Spelling-meaning connection in base words and derived words

· Common syllable patterns examined

· Greek and Latin word roots

· More complex prefixes and suffixes

· "Absorbed" prefixes

Teaching Spelling

Recent research suggests that students should actively explore words, comparing and contrasting them in order to discover patterns and principles, and that teachers should play an important role in this exploration (Henderson, 1985; Templeton, 1991; Zutell, 1994). This is in contrast to the perception that formal spelling instruction is a process of drudgery and brute memorization, involving low-level, rather dull exercises (Templeton, 1992) — a perception based on some of the poorly organized spelling programs of the past.

A well-constructed spelling program should provide for the following:

- Developmentally appropriate list words that the students are familiar with through their reading and need to use in their writing; at the intermediate grade levels, some new words should be included that are related in spelling and in meaning to these known words.
- Instructionally sound activities that do not emphasize rote memorization but that involve students in examining words from a variety of perspectives:

    1. Students should **compare**, **contrast**, **sort**, and **classify** the words.

    2. The activities should lead to generalizations about spelling patterns that apply to many other words, not just those in the list.

    3. Students should be encouraged to use the words in their writing.

    4. Game-like formats such as board games and card games are very effective in reinforcing memory for words and spelling patterns.

- Teach strategies for applying spelling knowledge and for extending word knowledge — how to think about spelling during drafting and editing in writing and during reading when figuring out an unfamiliar word.

Teaching About the Spelling-Meaning Connection

Spelling-meaning relationships among words become more extensive at the intermediate grades. We can state the **spelling-meaning connection** this way: Words that are related in meaning are often related in spelling, **despite changes in sound.**

Understanding this spelling-meaning phenomenon is a powerful aid for spelling as well as for vocabulary development. To get a sense of how this connection works, examine the following words that are related in terms of spelling and meaning: bom**b**/bom**b**ard; mus**c**le/mus**c**ular; comp**e**te/comp**e**tition. Because the words in each pair are related in meaning, the spelling of these sounds remains constant. Because of this phenomenon, we teach students the following strategy: If you're unsure how to spell a particular word, try to think of a word that is related in spelling and meaning; this will very often provide the clue.

Once students understand the spelling/meaning relationships among words, they can learn how the spelling or structure of familiar words can be clues to the spelling and the meaning of unknown words. For example, a student who spells **condemn** as CONDEM in her spontaneous writing may be shown the word **condemnation**: This not only explains the so-called "silent" **n** in condemn but expands the student's vocabulary at the same time.

Conclusions

Word knowledge is multifaceted. It includes both vocabulary and spelling. This is a new way of thinking about how vocabulary and spelling are learned and taught. We know that children do not learn words as discrete, unrelated items. Like the concepts for which they stand, words are understood in relation to one another. This is as true for the structure of words, their spelling, as it is for the concepts that underlie them. Research that has investigated the learning and teaching of vocabulary and spelling suggests that we should think about **vocabulary** development as a process of elaborating and expanding these underlying concepts and the words that represent them. We should think about **spelling** development as a process of elaborating an understanding of how words are represented visually, in turn developing and reinforcing underlying concepts.

Regarding vocabulary instruction specifically, we know that growth throughout the elementary school years and beyond is a continuing process of conceptual development. Students develop and expand underlying concepts as they acquire new vocabulary that represents these concepts. Students' independent learning as they read, write, and explore words will be the fundamental process of vocabulary development throughout the rest of their lives (Blachowicz and Fisher, 1994). Research is clear regarding implications for instruction that will ensure this independence: Wide reading plays a critical role in developing knowledge, and teachers facilitate this process by teaching strategies for learning words independently. Teachers should also directly teach important specific words, and they should develop and sustain students' interest in and curiosity about words.

Regarding spelling instruction specifically, we know that learners follow a developmental sequence in which their understanding evolves over the course of the elementary years to understand the three layers of information represented by spelling: **alphabetic**, **pattern**, and **meaning**. Spelling study reinforces word knowledge in general as it is applied in reading and in writing. In the intermediate grades, spelling and vocabulary become two sides of the same instructional coin through the "spelling-meaning connection," in that students recognize that words related in meaning share similar spellings. This visual preservation of meaning becomes a strategy for spelling words correctly as well as for expanding vocabulary knowledge.

Invitations to Literacy provides the literature, guided instruction, and knowledge base for developing a rich understanding of words and strategies for learning about their structure and their meaning.

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