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# Content-Area Vocabulary Research and Practice

Content learning is largely conceptual. Words are labels for content-area concepts. Although learning these words is critical to student success, teaching them can be challenging. Asking students to look words up in their dictionaries or glossaries and then to memorize definitions provides, at best, a short-term solution. In this book, we present a systematic and research-based alternative to vocabulary learning: a roots approach. Because most words are defined (and spelled) by what their parts mean, students can expand their vocabularies by learning how words are built from the roots up. Over 90 percent of all academic vocabulary derives from Latin or Greek roots (prefixes, suffixes, bases). Moreover, when new academic words are added to English, they too are often derived from Latin and Greek roots. The logic goes like this: learning roots helps students learn content vocabulary; one root can help students unlock the meaning of multiple words. Knowing content vocabulary helps students comprehend and learn social studies, science, and mathematics.

**Over 90 percent of all academic vocabulary derives from Latin or Greek roots.**

The units in this book center on common roots (prefixes and bases) in science, social studies, and mathematics. We present a total of 15 prefixes and bases that generate over 200 words from content-area vocabulary.

## What Does Research Say About Using a Roots Approach?

The size and depth of elementary students' vocabulary is associated with proficiency in reading comprehension. Effective vocabulary instruction results in higher levels of reading comprehension (Baumann et al. 2002; Beck, Perfetti, and McKeown 1982; Kame'enui, Carnine, and Freschi 1982; Stahl and Fairbanks 1986).

Morphological analysis (e.g., via a roots approach) is important because it is generative and allows students to make connections among semantically-related words or word families (Nagy and Scott 2000). In fact, developing morphological awareness is an integral component of word learning for young children (Biemiller and Slonim 2001). In a comprehensive review of 16 studies analyzing the effect of instruction in morphological awareness on literacy achievement, Carlisle (2010) observes that "children learn morphemes as they learn language" (465).

Classroom-based studies have demonstrated the effectiveness of teaching word parts and context clues in the primary and intermediate grades (Baumann et al. 2002; Baumann et al. 2005; Biemiller 2005; Carlisle 2000; Kieffer and Lesaux 2007; Mountain 2005; Porter-Collier 2010). Research in content-area vocabulary has demonstrated the effectiveness of teaching Greek and Latin word roots, especially for struggling readers (Harmon et al. 2005).

## Content-Area Vocabulary Research and Practice *(cont.)*

No single instructional method is sufficient. Teachers need a variety of methods that teach word meanings while also increasing the depth of word knowledge (Blachowicz et al. 2006; Lehr, Osborn, and Hiebert 2004). These methods should aim at fostering:

### Immersion

Students need frequent opportunities to use new words in diverse oral and print contexts in order to learn them thoroughly (Blachowicz and Fisher 2006).

### Metacognitive and metalinguistic awareness

Students must understand and know how to manipulate the structural features of language (Nagy and Scott 2000).

### Word consciousness

Word exploration (e.g., etymology) and word play (e.g., puns, riddles, games) help students develop an awareness of and interest in words (Graves and Watts-Taffe 2002, Lehr et al. 2004).



# Content-Area Vocabulary Research and Practice (cont.)

## What Is a Root?

A *root* is a word part that contains meaning and not merely sound. Roots are vocabulary multipliers—each root taught helps students discover the meanings of multiple words. There are three categories of roots, depending on their placement within a word:

### prefix

A root at the beginning of a word. For example, in the word *retraction*, the initial *re-* is a prefix, meaning “back,” “again.”

### base

The core root, which provides a word with its basic meaning. In the word *retraction*, the base is *tract*, which means “pull,” “draw,” “drag.”

### suffix

A root that ends a word. In the word *retraction*, the final *-ion* is a suffix, meaning “act of,” “state of.”

### Note:

The term *affix*, used in the Common Core State Standards, refers to either prefixes or suffixes. *Affix* contains an assimilated form of the prefix *ad-*, which means “to,” “toward,” or “add to.” And the Latin base *fix-* means “fasten” or “stick.” So an *affix* is a part of a word “added or fixed to” a base word either in front (prefix) or at the end (suffix).

## What Do Prefixes and Suffixes Do?

A prefix serves one of three functions:

- ◆ A prefix can *negate* a word by meaning “not.” The most common negating prefixes are *un-* (e.g., *unhappy*, *unwashed*) and negative *in-*, *im-*, *il-* (e.g., *invisible*, *impossible*, *illegal*). Some directional prefixes can also be negating. For example, the prefix variations *di-*, *dis-*, *dif-*, which mean “apart,” “in different directions,” can also mean “not” (*dissimilar* = “not similar,” a *difficult* task is “not” easy).
- ◆ A prefix can be *directional*: it sends the base of a word in a specific direction. The prefix *ex-* means “out,” *re-* means “back,” “again,” *sub-* means “under,” “below,” and *ad-* means “to,” “toward,” “add to.” For example, an exit sign indicates the way “out” of a building; we *descend* a staircase when we go “down”; when class *convenes*, it comes “together”; when class is *dismissed*, students scatter “in different directions”; when they *proceed* to their buses, they move “forward,” “ahead” to their bus stops.
- ◆ A prefix can have *intensifying force*, meaning “very,” “thoroughly.” A *perfectly* baked cake, for example, is “thoroughly” done. Quantitative and numerical prefixes are also intensifying.

A suffix changes the part of speech (e.g., *act*, *action*, *swift*, *swiftly*) or modifies the base (e.g., *fast*, *faster*).

# Content-Area Vocabulary Research and Practice *(cont.)*

## Why Teach with a Roots Approach?

Teaching with a roots approach is efficient. Over 60 percent of the words students encounter in their reading have recognizable word parts (Nagy et al. 1989). Moreover, content-area vocabulary is largely of Greek and Latin origin (Harmon et al. 2005). Many words from Greek and Latin roots meet the criteria for “tier two” words and are appropriate for instruction (Beck, McKeown, and Kucan 2002).

Root study promotes independent word learning, even in the primary grades (Carlisle 2010). In addition, roots are multipliers—that is, knowledge of one root can help students determine the meaning, pronunciation, and spelling of 10, 20, or more English words. With roots, students learn to make

connections among words that are semantically related (Nagy and Scott 2000). Research suggests that the brain is a pattern detector (Cunningham 2004). Latin and Greek word roots follow linguistic patterns that can help students with the meaning, sound, and spelling of English words. Indeed, Latin and Greek roots have consistent orthographic (spelling) patterns (Rasinski and Padak 2013; Bear et al. 2011).

Young readers’ word instruction is often characterized by a study of word patterns called *rimes*, *phonograms*, or *word families*. A Latin-Greek roots approach is the next logical and developmental step in word learning (Bear et al. 2011). Many English language learners speak first languages semantically related to Latin. For example, more than 75 percent of the words in Spanish come from Latin (Chandler and Schwartz 1961/1991). In fact, Spanish, Portuguese, French, Catalan, Italian, and Rumanian are all classified as “Romance Languages” because they derive from Latin, the language of ancient Romans. Enhancing this natural linguistic connection inherent in many of these languages can accelerate these students’ vocabulary growth (Blachowicz et al. 2006).

Many states are beginning to include a study of roots, including Latin and Greek derivations, in their elementary and middle school literacy standards. Indeed, the Common Core State Standards focus extensively on root-specific standards in the “Reading Foundational Skills” and “Language/ Vocabulary Acquisition and Use” sections. According to these standards, attention to roots should begin in kindergarten.

**Latin and Greek word roots follow linguistic patterns that can help students with the meaning, sound, and spelling of English words.**

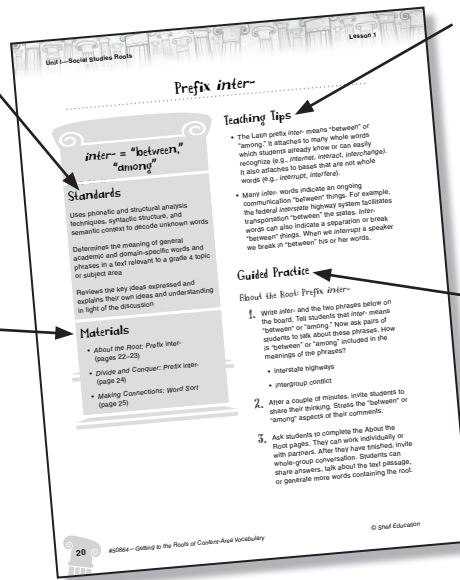
# How to Use This Book

This book offers three units. Unit I presents three prefixes, one base, and one suffix for words that appear in social studies. Unit II presents three prefixes and two bases for words that appear in science. Unit III presents two prefixes and several bases that appear in mathematics. The following information will help you implement each lesson within the three units.

## Lesson Overview

A list of **Standards** (McREL and Common Core State Standards) is included in each lesson.

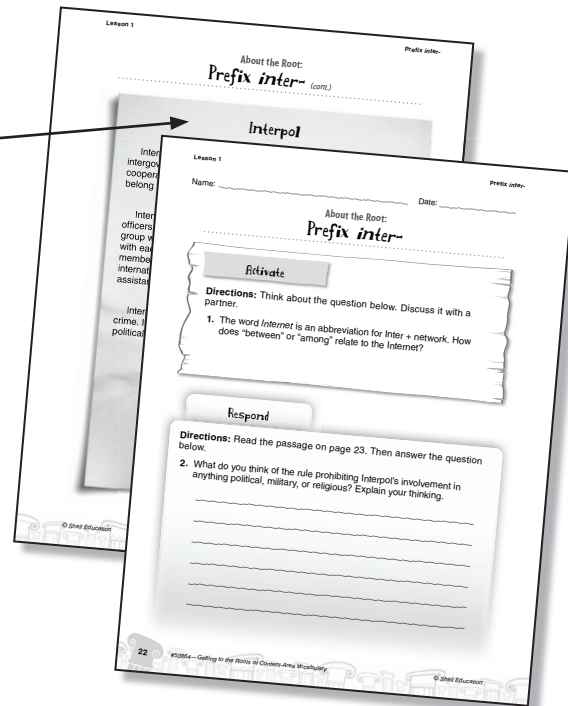
The **Materials** listed include the activity pages for students.



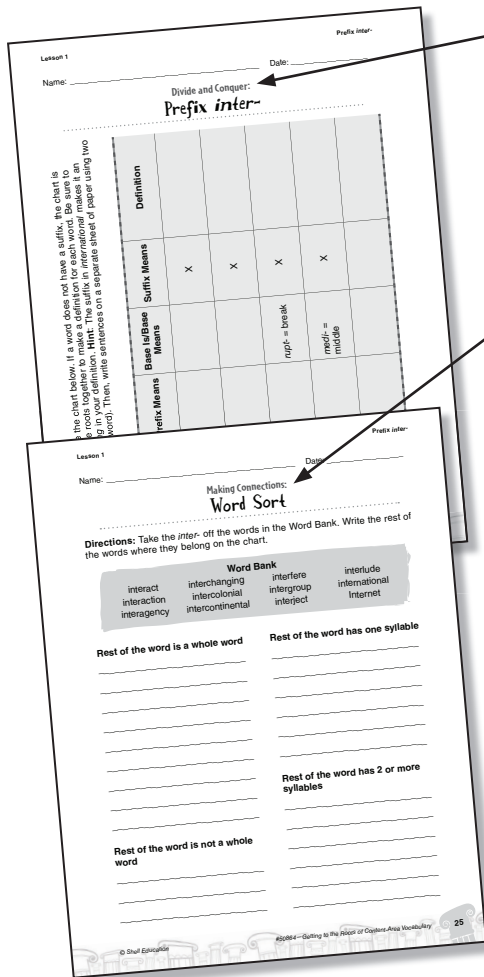
**Teaching Tips** provide essential information about the root. Reading this section before you teach the lesson will provide you with a foundation to ensure student success.

The **Guided Practice** portion of each lesson includes suggestions for implementing each of the student activity pages.

The **About the Root** activities are introductions and include short passages using the root of focus. The purpose of these passages is to show students contextual use of the root in the content areas. As students read to themselves or listen to the teacher read aloud, they identify the prefix or suffix words in extended texts that center on a wide range of interesting topics.



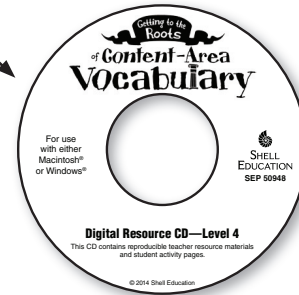
# How to Use This Book *(cont.)*



The **Divide and Conquer** activities allow students to pull words apart. They dissect the parts of the words, understand the meaning of these parts, and then gain a greater understanding of the word as a whole.

The **Making Connections** activities allow students to use their knowledge of roots to make connections to vocabulary and offer students the opportunity to extend their exploration of the root(s) through activities such as word sorts, riddles, representing the roots and related words in drawings, and gamelike tasks. They may need to distinguish when to use a certain root or which way the root is used in a word.

All of the student activity pages and additional resources can be found on the **Digital Resource CD**.





## Prefix *tele-*

*tele-* = “far,” “from afar”

### Standards

Uses phonetic and structural analysis techniques, syntactic structure, and semantic context to decode unknown words

Determines the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 4 topic or subject area

Reviews the key ideas expressed and explains their own ideas and understanding in light of the discussion

### Materials

- *About the Root: Prefix tele-* (pages 60–61)
- *Divide and Conquer: Prefix tele-* (page 62)
- *Making Connections: New Endings* (page 63)

### Teaching Tips

- The Greek prefix *tele-* means “far” or “from afar.” Students will recognize it from words such as *telephone* and *television*. *Tele-* often attaches to bases dealing with sight and sound (e.g., *-scope* = “view,” “watch”; *-graph*, *-gram* = “write”; *vis-* = “see”; *phon-* = “voice,” “sound”).
- **Note:** The *television* and *telephone* have become such common devices around the world that some *tele-* words refer directly to either the telephone or television:
  - A *telethon* is a “televised marathon,” which runs for many hours and raises money.
  - A *telemarketer* contacts customers with the telephone.

### Guided Practice

#### About the Root: Prefix *tele-*

1. Write *tele-* on the board. Tell students that this Greek prefix means “far” or “from afar.” Ask pairs of students to figure out how these words include the idea of “far” or “from afar.” After a few minutes, invite whole-class conversation.
  - telescope
  - telephone
  - television
2. Ask students to complete the About the Root pages. They can work individually or with partners. After they have finished, invite whole-group conversation. Students can share answers, talk about the text passage, or generate more words containing the root.

## Prefix *tele-* (cont.)

3. After students have discussed the Activate activity, invite whole-group conversation. You may wish to have students write down the shared ideas to revisit at a later time.

### Divide and Conquer: Prefix *tele-*

4. As you guide students through Divide and Conquer, use questions like these to generate discussion about each of the words:
- Where is the meaning of “far” or “from afar” in the word \_\_\_\_\_?
  - Where might you see the word \_\_\_\_\_?
  - Can you think of an example of \_\_\_\_\_?
  - Does \_\_\_\_\_ have more than one meaning? If so, how are those meanings the same? How are they different?
  - How is the word \_\_\_\_\_ different from the word \_\_\_\_\_?

### Making Connections: New Endings

5. To conclude, you might ask students to work in groups to share their sentences. They can also share their ideas about what the words have to do with “far” or “from afar.”

#### Words with *tele-*

telecast	telenergy
telecommunication	telephone
telecommute	teleplay
teleconference	telerobotics
telegram	telescope
telegraph	telescopic
telegraphy	telethon
telemarketer	television
telemechanic	televise
telemeter	televised

To print a full list of words for students, see page 152.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

About the Root:  
**Prefix *tele-***

---

**Activate**

**Directions:** Think about the bases below. Work with a partner to create a word that includes these bases with *tele-*. Discuss what each word means.

1. *vis-* = “see”
2. *-scope* = “watch,” “look at”
3. *phon-* = “voice,” “sound”

**Respond**

**Directions:** Read the passage on page 61. Then answer the question below.

4. How do you think telephones changed the way people lived in the 1880s and 1890s?

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About the Root:  
**Prefix tele-** (cont.)

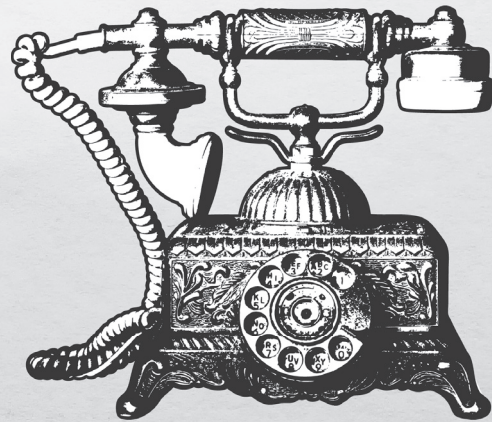
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## Invention of the Telephone

Telephones and telegraphs are related. They are wire-based electrical systems. In fact, when Alexander Graham Bell invented the telephone in the 1870s, he was actually trying to improve on the telegraph.

Telegraphs can send and receive only one sound (or note) at a time. This is why the Morse code, a series of shorter and longer sounds, was used to send telegrams. Bell hypothesized that several sounds (or notes) could be sent along a line at the same time as long as the sounds differed in pitch. He was right, of course, and his tests led to the invention of the telephone.

At the same time that Bell was experimenting, Elisha Gray, another American inventor, was also testing ideas about telephones. In fact, each man submitted a patent application for a telephone—on the same day. Bell's application came in a few hours earlier than Gray's. This is why we associate the invention of the telephone with Alexander Graham Bell.



Name: \_\_\_\_\_ Date: \_\_\_\_\_

Divide and Conquer:  
**Prefix tele-**

**Directions:** Complete the chart below. Put the roots together to make a definition for each word. Be sure to use *far* or *from afar* in your definition. Then, write sentences on a separate sheet of paper using two words from the chart.

Word	Prefix Means	Base Means	Definition
1. telescope		<i>scop-</i> = watch, look at	
2. telegram		<i>gram-</i> = write, draw	
3. telephone		<i>phon-</i> = sound	
4. televise		<i>vis-</i> = see	
5. telegraph		<i>graph-</i> = write, draw	

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Making Connections:  
**New Endings**

.....

**Directions:** Work with a partner. Change the endings on the words below to make new words. Make sure the new words contain *tele-* (e.g., *telethon*). Then write a sentence that uses both words. (Example: *We watched all 10 hours of the charity telethon on our new television.*)

**1. televise**

new word: \_\_\_\_\_

sentence: \_\_\_\_\_  
\_\_\_\_\_**2. telecast**

new word: \_\_\_\_\_

sentence: \_\_\_\_\_  
\_\_\_\_\_**3. telephone**

new word: \_\_\_\_\_

sentence: \_\_\_\_\_  
\_\_\_\_\_

*Tele-* means “far.” Talk to a partner: What do the words in bold have to do with “far”? Write your answers on a separate sheet of paper.

**4. telephoto** lens**5. telethon** to raise money for a charity**6. telecommuting** to a job