Intensive Intervention Practice Guide:
Explicit Morphology Instruction to Improve Overall Literacy Skills in Secondary Students

Lauren Hennenfent, Michigan State University
Lindy J. Johnson, Michigan State University
Christina Novelli, University of Georgia
Erin Sharkey, University of Illinois Chicago

IDEAs
that Work
U.S. Office of Special
Education Programs

NCLii

NATIONAL CENTER FOR
LEADERSHIP
IN INTENSIVE INTERVENTION

Fall 2022

NCLii
NATIONAL CENTER FOR
LEADERSHIP
IN INTENSIVE INTERVENTION

Contents

What Is It?

Morphology

In this *Intensive Intervention Practice Guide*, we will describe morphology and explain how teaching morphology can improve the reading skills of secondary-age students with reading and writing difficulties. In English, the spellings of words include information about both meanings and sounds. As a result, learning about morphology can help readers with *word recognition* (knowing the pronunciations and meanings of printed words). Good word recognition skills, in turn, contribute to better reading comprehension. It can also help with spelling (Perfetti, 1992; Seidenberg 2005; Tainturier & Rapp, 2001).

Learning about morphology is especially useful because half of the words in English contain more than one morpheme (a word part with one meaning; Nagy & Anderson, 1984). For example, the word *restarted* comprises three morphemes, *re, start,* and *ed. Start* is a word on its own, *re* shows that the start has happened before, and *ed* shows this *restart* happened before. In addition, texts for secondary-age students contain an increasing number of words with multiple morphemes (*morphologically complex* words). In short, when students learn word recognition skills for morphologically complex words, this is likely to improve many literacy skills including spelling, vocabulary knowledge, and reading comprehension (Carlisle & Kearns, 2017; Kirby & Bowers, 2017; Perfetti & Hart, 2002). Thus, instruction of morphemes helps students improve their overall literacy skills.

A morpheme is the smallest meaningful unit in a language (Carlisle, 1995). These units are important as they typically are spelled the same way across words (Levesque et al., 2021). Morphemes can be divided into two categories: free and bound. A free morpheme can stand alone as a word (e.g., *cook*). Free morphemes can be combined into compound words (e.g., *cookbook*). On the other hand, bound morphemes cannot stand alone and are units attached before (prefixes) or after (suffixes) a free morpheme. Bound morphemes work as inflectional or derivational. Inflectional morphemes contain syntactic information, such as change in tense (e.g., *-ed, -ing; cooked*) or number (e.g., *-s, -es; books*). Derivational morphemes change the meaning of a word (e.g., *cook + er = someone or something that cooks*). Researchers emphasize that explicit instruction in morphology is an effective teaching method to improve overall literacy skills (Kirby & Bowers, 2017; McLeod & Apel, 2015; Wilson, 2018).

Explicit Instruction

Explicit instruction is a way of teaching in which teachers (1) explain concepts clearly, along with models and examples, and (2) provide extensive guided and independent practice. Explicit instruction is a direct approach that incorporates examples, practice, and feedback to lead the student to incremental mastery of well-defined learning targets (Archer & Hughes, 2011). The elements of explicit instruction are interwoven throughout a lesson. A lesson could include (1) review of previous learning, (2) clear presentation of a learning target and new content through modeling and examples, (3) guided practice with increased opportunities to respond paired with prompting and feedback, as needed, (4) any reteaching that is needed based on guided practice, and (5) independent practice that reflects accurate responding towards fluency (Archer & Hughes, 2011). Steps for morphology instruction using explicit instruction will be provided in the How Does it Work? section below.

Explicit Morphology Instruction to Support Word Recognition Skills

This guide includes information about teaching students about morphemes for the purpose of improving students' word recognition and spelling skills. Students need to learn the meaning of parts of words and be able to read those parts to develop quality word recognition.

For Whom Is It Intended?

By definition, students with dyslexia have a word-reading disability; therefore, instruction in morphology is beneficial (Austin et al., 2022). Further, research on children with dyslexia suggests older children exhibit problems based more in morphology than in phonology (Champion, 1997); thus, explicit instruction in morphology is recommended (Casalis et al., 2004). In addition, students with speech and language impairment are at-risk for literacy difficulties; thus, morphological instruction is advantageous (McLeod & Apel, 2015; Wolter & Green, 2013). Morphology instruction also supports bilingual learners to see similar word parts across different words (Crosson et al., 2018; Keiffer & DiFelice, 2013).

While morphology may seem like a basic skill meant for early readers and communicators, it is also an invaluable tool for older students. As students progress through middle and high school, morphological awareness and knowledge are important tools for learning new words. Morphology helps students "unpack complex words," which is critical for both decoding and comprehending academic language (Uccelli et al, 2015, p. 14). Word knowledge is critical in all school subjects

NCLii NATIONAL CENTER FOR LEADERSHIP IN INTENSIVE INTERVENTION

since academic language is present in all subjects such as social studies, sciences, mathematics, and language arts (Truckenmiller et al., 2019). For example, a student who has learned the Greek root word "bio" means "relating to human life" (MacMillan, n.d.) and -logy means "the study of" will be able to infer the meaning of the word "biology" if encountering it in a new context, which can have a positive effect on their reading comprehension (Carlisle, 2000). Teaching morphemes that are likely to occur across content areas will help students to develop cognitive flexibility as well (Spiro et al., 1987; Wolter & Collins, 2017). If a student has learned the meaning of "bio" in science class, they can transfer that knowledge to their language arts class when they learn that "biography" means the written account of a person's life.

How Does It Work?

The purpose of morphology instruction is to (a) support accurate and fluent polysyllabic (poly = more than one) reading, (b) improve spelling of polysyllabic words, and (c) aid vocabulary development and reading comprehension. Thus, instruction needs to move from part (morphemes) to whole (polysyllabic words). There are established evidence-based interventions. A list of these interventions with a brief overview can be found in Table 1. Below are guidelines that combine components of explicit instruction, vocabulary instruction, and word-meaning instruction (Archer & Hughes, 2011; Austin et al., 2022; Beck et al., 2013). If you do not have access to a program that is evidence-based, then these steps are one way to approach this instruction.

Step 1: Select Affix or Base to Teach

First, you will need to select the morpheme you will teach in the lesson. It is important to explicitly teach affixes and roots (Goodwin & Ahn, 2010). In the *Where Can I Learn More?* section there is a link to an article that identifies high utility morphemes for instruction (Lane et al., 2019).

Step 2: Develop Word Lists in Preparation for Instruction

Keys to explicit instruction are the use of modeling examples and non-examples, multiple practice opportunities, and feedback. It is imperative to prepare how to explicitly teach the affix or base, as well as to provide multiple words to practice reading and spelling polysyllabic words which include the taught affix or base. Sources such as *Word Building and Spelling Experiments in English Morphology* (Ramsden, 2013) and *Phinder* (Kearns, 2022) are resources teachers can use to develop word lists by morphemes and phonemes. In addition, *The Academic Word List* (Coxhead, n.d.) is a list of academic words. You can find links for these resources in *Where Can I Learn More?* section.

NCLii NATIONAL CENTER FOR LEADERSHIP IN INTENSIVE INTERVENTION

Step 3: Teach Explicitly

1. Review previously learned affixes.
2. Identify the learning target and introduce new content. Students should participate through choral responding.
   - Display and name the affix or base
   - Define affix or base
   - Provide ample examples (and non-examples if applicable) of words featuring the morpheme. Make sure to explicitly define the words and emphasize how meaning is connected to the taught morpheme.
3. Guided practice: students should have opportunities to read across words, phrases, sentences, and text with corrective feedback.
   - Words in isolation
   - Words in sentences
   - Connected text
   - Spelling dictation
4. Reteach based on guided practice
5. Independent practice that reflects accurate responding toward fluency
   - Words in isolation
   - Words in sentences
   - Connected text
   - Spelling dictation

You can find an example of Step 3: Teach Explicitly in Table 2. In addition, morphology instructional activities with examples can be found in Table 3. These activities can be used for guided or independent practice, as well as, be incorporated throughout other content area instruction.

How Can Families Support Implementation?

Because morphology is a part of all languages and modalities (reading, writing, listening, and speaking), there are many ways for families to support learning beyond the classroom.

Talking Together

Probably the most accessible modality to target learning and practice of morphological knowledge is simply by talking. One of the many challenges of morphology is how it impacts the pronunciation of words (Carlisle & Kearns, 2017), so it can be challenging for students to connect the polymorphemic words they hear with their written counterparts. Whenever you come across a polymorphemic word in environmental text (e.g., advertisements, Instagram captions, tweets, etc.), draw attention to it and practice saying it. Sometimes the pronunciation of root words will change when different affixes are present (e.g., local to locality; nature to natural; Wolter & Green, 2013). Saying these words provides auditory feedback for students to improve word recognition (Carlisle & Kearns, 2017) and connect the spoken version of words to their written counterparts, while also helping students understand the reason for "silent letters" that can be found in some words ("sign" and "signature;" "bomb" and "bombardment;" Wolter & Green, 2013).

Reading and Writing

In addition to verbal language contexts, morphological knowledge can be built and reinforced anytime one encounters print. Because middle and high school students use textbooks and other print materials for learning new content, being able to access this print is critical for academic success (Uccelli et al, 2015). Helping older students practice reading and writing polymorphemic words is useful practice because it binds the spelling, phonology, and semantic properties of words that are present in both academic and environmental text (Nagy et al., 2006). By implementing just a few minutes each day of intentional reading and/or writing of new vocabulary words at home, caregivers can help their students build morphological knowledge, which can transfer to all areas of literacy (Reed, 2008).

How Adequate Is the Research Knowledge Base?

Morphological knowledge has been found to impact word reading accuracy (Carlisle, 1995, 2000; Carlisle & Katz, 2006; Roman et al., 2009), vocabulary knowledge (Bertram, et al., 2000; Carlisle, 2007) and spelling (Deacon et al., 2009). Further, morphological knowledge impacts reading comprehension, even when controlling for other variables necessary for accurate comprehension (Carlisle, 1995, 2000; Deacon & Kirby, 2004; Elbro & Arnbak, 1996). Struggling readers may particularly benefit from morphological knowledge (Carlisle et al., 2001; Casalis et al., 2004; Elbro & Arnbak, 1996).

Multiple studies have described the effectiveness of morphology instruction on student outcomes (Bowers et al., 2010; Goodwin & Ahn, 2010; Reed, 2008). *REWARDS*® has demonstrated medium effect sizes, and strong Tier 1 ESSA evidence rating (Butler, 2014; Shippen, 2004). *Language!* has shown medium effect size for improvement in student Lexile scores (Fields, 2014).

How Practical Is It?

Morphology cannot be neglected at any stage of reading development because of the impact of morphological awareness on word reading, spelling, and reading comprehension (James et al., 2021; Levesque et al., 2021). As such, secondary readers, particularly readers who struggle, should receive explicit instruction in morphemes as part of their reading instruction. Morphology instruction can be taught in whole group lessons, small group lessons, or 1:1. Lessons can typically be delivered in 20- to 60-minute increments, and some evidence-based interventions can be conducted in as few as 20 sessions. Where elementary students can receive instruction in ELA blocks as a whole group or small group, secondary students can receive instruction during an elective reading intervention period or during study hall. Push-in or pull-out support can be initiated for small groups or 1:1 instruction during ELA, English or reading class time. Bowers et al. (2010) noted a foundation of morphological instruction may particularly benefit students who fail to respond to typical instruction.

Currently, many classrooms do not incorporate systematic instruction in morphology (Henry, 2003; Moats, 2009; Nunes & Bryant, 2006). Instruction can be implemented by a special education teacher, general education teacher, interventionist, or school support personnel trained and supervised by a certified staff member. Instruction can be integrated into any content using the steps outlined previously or an evidence-based intervention can be used. The specific intervention will dictate the appropriate training and skills required for implementation. Interventions such

as *REWARDS*® are scripted, and, therefore can be implemented by school support personnel, if necessary, with adequate training and guidance. Many evidence-based interventions have been adapted for remote learning, and therefore can be implemented in after-school tutoring sessions, or other virtual settings as needed. In classroom settings, visuals to support instruction can be displayed with common prefixes, suffixes, and vowel sounds (e.g., *REWARDS*® posters).

How Effective Is It?

To support comprehension, knowledge of word meaning is essential, and knowledge of word meaning positively impacts reading accuracy, fluency, and retention (Austin et al., 2022). James and colleagues (2021) substantiated earlier research describing the fundamental role morphological awareness has on reading comprehension across reading levels. Educational researchers have conducted many studies of morphological knowledge and learning in children of many different backgrounds. Striving readers, emergent bilinguals, students with disabilities, and typical learners have all been involved in these studies. The plethora of research has allowed researchers to conduct multiple wide-scoping reviews to draw overall conclusions about the role of morphology for overall literacy development. We summarize the research specifically for two types of learners next.

Emergent Bilinguals

For students learning English as a second language, morphology has been shown to be a valuable language-learning tool. More than 50% of English words are morphologically complex (Wolter & Green, 2013), making it crucial for emergent bilinguals to learn both a new language and academic content. It's suggested that, when explicitly taught in English (as a second language) morphology knowledge can transfer between a first and second language, especially Latinate languages (e.g., Spanish), but less so for other languages (Curinga, 2014). While there are many factors that impact language acquisition, morphological awareness and knowledge helps emergent bilingual learners infer word meaning, generate meaningful language, and comprehend both oral and written language (Uccelli et al, 2015).

Language-based Learning Disabilities

Students with language-based learning disabilities, such as dyslexia, specific learning disabilities in writing, and developmental language disorder benefit greatly from explicit morphology instruction. Students with dyslexia might utilize morphological knowledge to compensate for poor phonological skills, so explicit morphological instruction can be a powerful building block on current knowledge (Bowers et. al, 2010). Lesaux and colleagues (2010) demonstrated medium effect sizes on knowledge of word taught for *ALIAS.*

NCLii
NATIONAL CENTER FOR
LEADERSHIP
IN INTENSIVE INTERVENTION

What Questions Remain?

Although there has been a great deal of research around literacy in general, the specific area of morphological awareness and instruction, especially for older middle and high school students, is still a "largely unexplored area of language and literacy instruction" (Carlisle, 2010, p. 478). As both Carlisle (2010) and Bowers et al. (2010) point out in their analyses of multiple morphological awareness intervention studies, researchers are beginning to address this gap but as of yet, many questions remain.

For example, it has been well-established that morphological awareness (also called knowledge) is strongly related to students' spelling (Deacon & Kirby, 2004; Nagy et al., 2006; Nunes et al., 2006; Carlisle, 2010), vocabulary knowledge (McBride-Chang et al., 2005; Nagy et al., 2003), and reading comprehension (Carlisle, 2000; Deacon & Kirby, 2004; Foorman et al., 2012; Nagy et al., 2006), but it is unclear exactly what type of morphology instruction works best to achieve these outcomes (Reed, 2008). While it is certain that morphology needs to be explicitly taught, more research needs to be done in this area before it is known how it is best taught.

Additional questions include:
- How do researchers design and implement morphology intervention studies for middle and high school students in cross-curricular contexts (e.g., science vs. history)?
- How do we address issues of linguistic equity for students who use nonmainstream dialects and/or are learning English?
- Which particular affixes are more difficult to learn and understand?
- Does morphological knowledge naturally increase with age (Bowers et al., 2010)?

Where Can I Learn More?

Background Knowledge

- **Austin & Boucher (2022). Integrating Word-Meaning Instruction Within Word-Reading Instruction.**
  https://doi.org/10.1177/2F10534512211047592
  This research-to-practice article helps to explain how the linking of decoding and word meaning can help students become stronger readers by increasing their fluency, accuracy, and overall vocabulary knowledge.

- **DyslexiaHelp (2022). Morphological Awareness: The Power of Morphology.**
  http://dyslexiahelp.umich.edu/professionals/dyslexia-school/morphological-awareness
  This webpage can be found on DyslexiaHelp, a website created by Dr. Joanne Pierson of the University of Michigan. This page gives a solid overview in understanding morphological awareness, as well as a list of activities parents and teachers can do with their students to help with this skill.

- **Hogan (2020). Morphology and Morphological Awareness with Julie Wolter by SeeHearSpeak Podcast.**
  https://anchor.fm/tiffany-hogan/episodes/Episode-33-Morphology-and-morphological-awareness-with-Julie-Wolter-ehrcm3
  This podcast, from host Dr. Tiffany Hogan, is full of information for teachers and speech-language pathologists who are looking to understand the role that morphological awareness plays in learning to read for students who struggle with language. It also includes practical tips for integrating morphological knowledge into current instruction.

Instructional Guides

- **Kirby & Bowers (2012). Morphology Works.**
  https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1050.3965&rep=rep1&type=pdf
  This guide from two of the top researchers in morphology was written to take findings from studies and translate them into teacher-friendly language, giving ideas and resources for classroom practice.

- **Kearns & Whaley (2019). Helping Students with Dyslexia Read Long Words: Flexible Strategies Using Syllables and Morphemes.**
  https://doi.org/10.1177/0040059918810010
  A practitioner piece that not only gives many strategies for teaching older students to read more complex words, but also a plethora of real world examples as well as charts and graphics that help teachers find and understand the strategies that will work best for their students.

- **Vaughn et al. (2022). What Works Clearinghouse Educator's Practice Guide: Providing Reading Interventions for Students in Grades 4–9.**
  https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/WWC-practice-guide-reading-intervention-full-text.pdf
  This is a comprehensive guide to providing reading instruction for older students. Morphology-specific information can be found within Recommendation 1, "Build Students' Decoding Skills So They Can Read Complex Multisyllabic Words" (pp. 4–11).

- **Zeh (2017). Teaching Morphology to Improve Literacy: A Guide for Teachers.**
  https://www.uwo.ca/fhs/lwm/teaching/dld2_2017_18/Zeh_Morphological-Awareness.pdf
  This teaching guide, written by a speech-language pathologist, gives a general overview of morphological awareness for teachers, as well as nine sample activities to try in a classroom or intervention setting.

Interventions/Student Activities

- **Goodwin, Lipsky, & Ahn (2012). Word Detectives: Using Units of Meaning to Support Literacy.**
  https://www.researchgate.net/publication/260281504_Word_Detectives_Using_Units_of_Meaning_to_Support_Literacy
  A practitioner-friendly article that gives a background overview of morphology instruction and ideas for how teachers can integrate morphological awareness into their current literacy practices.

- **Wolter & Collins (2017). Morphological Awareness Intervention for Students Who Struggle with Language and Literacy.**
  https://mydigitalpublication.com/publication/?i=398575&article_id=2757854&view=articleBrowser&ver=html5
  An easy-to-read article with an explanation of intervention strategies, as well as many examples of specific activities to do with students.

- **Florida Center for Reading Research (2005). Fourth and Fifth Grade Student Center Activities.** https://fcrr.org/student-center-activities/fourth-and-fifth-grade

Specific Activities to Teach Morpheme Structures:		
Compound Construction	Inflection Reflection	Affix Sort
Four Word	Affix Fit	Root Hoot
Embellished Words	If the Clue Fits	Word Way
Affix Wiz	Root Rap	Word Part Rush
Affix Concentration	Meaningful Affixes	Word Dissect
Getting to the Root of It	Root-O!	Affix Game

NCLii NATIONAL CENTER FOR **LEADERSHIP** IN INTENSIVE INTERVENTION

Resources for Instructional Planning

- **Coxhead (n.d.). The Academic Word List.**
  https://www.wgtn.ac.nz/lals/resources/academicwordlist

- **Kearns (2022). Phinder.**
  https://devinkearns.com/phinder/

- **Lane, Gutlohn, & van Dijk (2019). Morpheme Frequency in Academic Words: Identifying High-Utility Morphemes for Instruction.**
  https://education.ufl.edu/patterson/files/2020/05/Morphemes-and-Their-Meanings.pdf

- **Ramsden (2013, January). Word Building and Spelling Experiments in English Morphology.**
  http://www.neilramsden.co.uk/spelling/index.html

- **Van Cleave (2009). Morphology Matters: Building Vocabulary Through Word Parts.**
  https://www.wvced.com/wp-content/uploads/2019/04/Morphology-Matters-4-1-19.pdf

Appendix A

Table 1
Types and Purposes of Morphology Interventions

Type / Name	Purpose	Mode of Delivery	Time Required
REWARDS® (Intermediate Grades 4-6; Secondary Grades 6-12)	To teach grade-level decoding of multisyllabic words, increase oral and silent reading fluency rate, and expand vocabulary.	• Tier 1 - Core Instruction • Tiers 2 & 3 - Intervention Classes • Specially Designed Instruction/Resource Class • Intensive Intervention Programs (after school, summer school) • Whole group, small group or 1:1	• 6-weeks • Lessons 1-12 are 50 to 60 minutes each • Lessons 13-20 are 90 minutes each (two class periods)
Language!® **4th Edition** (Grades 4-12)	For students who are substantially below grade-level expectations for literacy. Program addresses phonemic awareness, phonics, word recognition, spelling, vocabulary, morphology, grammar and usage, listening and reading comprehension, and speaking and writing.	• Tiers 2 & 3 • Specially Designed Instruction/Resource Class • Classroom (teacher led) in small groups	90-120 minute lessons (can be broken down to 45 minute lessons); students placed based on placement test (typically intervention given for the school year)
Language® Live! (Grades 5-12)	Language® Live! addresses the same areas as Language!® 4th Edition in a blended online and teacher-led format.	• Tiers 2 & 3 • Specially Designed Instruction/Resource Class • Classroom (teacher led & online) and groups can be larger than for Language!® 4th Edition	90 minute lessons (can be broken down to 45 minute lessons); students placed based on placement test (typically intervention given for the school year)
Academic Language Instruction for All Students (ALIAS) (Grades 5-12)	Broad literacy curriculum with morphology component, including word parts and multiple meanings of words. Program instructs on academic vocabulary.	• Tiers 2 & 3 • Specially Designed Instruction/Resource Class • Classroom (teacher led)	• 45 minutes per day • 8 units + 2 review units • 18 weeks

NCLii
NATIONAL CENTER FOR
LEADERSHIP
IN INTENSIVE INTERVENTION

Table 2
Example of Step 3: Teach Explicitly

Step 3: Teach Explicitly	Example
(1) Review previously taught affixes.	**T:** *Your warm-up is to define the list of affixes on the board. We will review them before jumping into today's learning.* **S** work to define the following affixes: de-, re-, in- con-, ob-, -ion, -ive, -or, -ure, -s) for a designated time (e.g., 3 minutes). **T:** *Okay, let's review the affixes.* Reviews all of the definitions by eliciting student responses.
(2) Identify learning target	**T:** *Today we are going to learn a new root word. Display struct. The root is struct. What is it?* **S:** *Struct* **T:** *Yes, struct is of Latin origins and means to build. What does struct mean?* **S:** *To build* **T:** *Let's look at some examples of words with the root struct. Display con- in front of struct. Now we have con + struct...construct. What word?* **S:** *Construct* **T:** *Yes, construct. We know con means "with" or "together" so construct means to put things together to build.* Display -ion after construct. *If we add -ion, we get construction. This means the act of building by bringing things together.* **T** presents a few more examples: obstruct, obstruction, instruct, and instructor, structure, reconstruct
(3) Guided practice	**T:** Display word matrix combining reviewed affixes and the new root. *Now you are going to use the matrix to generate a list of words with your partner. After generating the list, you will define the words.* **S** work with partners to generate a list of possible words and define them. **T** provides feedback when necessary. *Now you are going to complete this fill-in-the-blank activity together using these words in context.* **S** with partners work on the activity **T** provides feedback when necessary. *Now let's practice spelling.* Have students provide words and guide the group through spelling each morpheme to produce correct spellings of the words.

NCLii NATIONAL CENTER FOR
LEADERSHIP
IN INTENSIVE INTERVENTION

Table 2
Example of Step 3: Teach Explicitly

Step 3: Teach Explicitly	Example
(4) Reteach	**T** will reteach any words that need to be reviewed for word reading, word meaning, or spelling.
(5) Independent practice	**T** provides independent practice opportunities for students to practice reading words that contain struct and defining these words in and out of context. **T:** *Now we will do our spelling dictation.* Dictate words with definitions for students to spell. *The first word is instruct – to build upon; to teach.* **S** spell the word **T:** *Next word obstructive – preventing building or movement* **S** spell the word **T** continues dictating the following words: destruct – undo the building of, reconstructed – past tense of build again, structures – made up of many parts, instructors – people who build upon or teach, structural – relating to the building of something)

Table 3
Morphology Instructional Activities

Strategy	Purpose	Example
Word Sums	To show how words are built by separating each element and showing how words join with a "+" sign.	*Word sums (16)* graph + er --> grapher graph + ic --> graphic auto + graph --> autograph holo + graph --> holograph photo + graph --> photograph biblio + graph + y --> bibliography calli + graph + y --> calligraphy choreo + graph + y --> choreography geo + graph + y --> geography geo + graph + ic --> geographic geo + graph + ical --> geographical bio + graph + y --> biography bio + graph + ical --> biographical auto + bio + graph + y --> autobiography auto + bio + graph + ical --> autobiographical bio + graph + er --> biographer Created with Mini Matrix-Maker ©2011-2022 Neil Ramsden http://www.neilramsden.co.uk/spelling/matrix/temp/index.html
Word Matrices	A graphical way of showing families of word sums.	auto / biblio / calli / choreo / geo / holo / photo — auto bio — **graph** *"written, drawn, printed"* — er / ic / ical / y Created with Mini Matrix-Maker ©2011-2022 Neil Ramsden http://www.neilramsden.co.uk/spelling/matrix/temp/index.html

Table 3
Morphology Instructional Activities
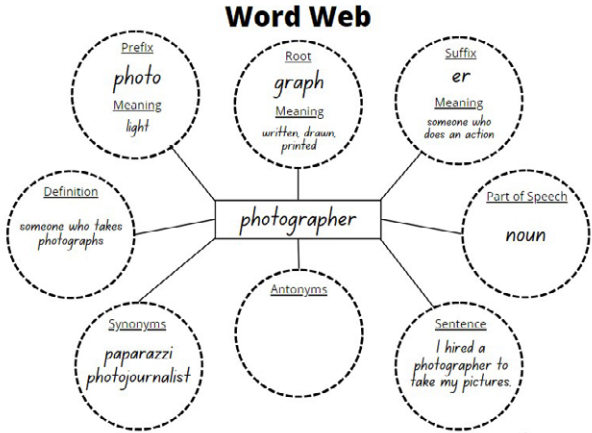
Strategy	Purpose	Example
Word Sorts	Categorical sorting of words based on patterns.	**Word Sort** Sounds like /ed/ — Example: added Sounds like /t/ — Example: jumped Sounds like /d/ — Example: dressed kissed, ended, placed, turned, filled hugged, landed, banned, missed, kicked listed, mailed, watched, raked, laughed decided, followed, locked, sounded, mixed rubbed, passed, cracked, fried, walked © 2022 Lindy J. Johnson
Word Mapping	A visual organizer to visualize a word, often with synonyms, using the word in a sentence, and potentially drawing a picture of the word.	**Word Map** Word: photographer Prefix: photo — Meaning: light Root: graph — Meaning: written, drawn, printed Suffix: er — Meaning: someone who does an action Meaning: someone who takes photographs (A photograph is a picture taken with light!) Sentence: I hired a photographer to take my pictures. Picture: ©2022 Lindy J. Johnson

Table 3
Morphology Instructional Activities

Strategy	Purpose	Example
Word Families	Groups of words with common features or patterns with similar sounds.	 From "Getting to the Root of It" ©2005 The Florida Center for Reading Research and Florida Department of Education (Revised, 2022) https://fcrr.org/sites/g/files/upcbnu2836/files/media/PDFs/student_center_activities/45_morphemic_elements/45_v015_getting_to_the_root_of_it.pdf
Word Web	A tool to help students associate the word to similar words or expand on the definitions, or to further break down the word.	

References

Archer, A., & Hughes, C. (2011). *Explicit instruction: Effective and efficient teaching*. Guilford.

Austin, C. R., & Boucher, A. N. (2022). Integrating word-meaning instruction within word-reading instruction. *Intervention in School and Clinic, 58*(1), 21-30. https://doi.org/10.1177/10534512211047592

Austin, C. R., Vaughn, S., Clemens, N. H., Pustejovsky, J. E., & Boucher, A. N. (2022). The relative effects of instruction linking word reading and word meaning compared to word reading instruction alone on the accuracy, fluency, and word meaning knowledge of 4th-5th grade students with dyslexia. *Scientific Studies of Reading, 26*(3), 204–222. https://doi.org/10.1080/10888438.2021.1947294

Beck, I. L., McKeown, M. G., & Kucan, L. (2013). *Bringing words to life: Robust vocabulary instruction*. Guilford.

Bertram, R., Laine, M., & Virkkala, M. M. (2000). The role of derivational morphology in vocabulary acquisition: Get by with a little help from my morpheme friends. *Scandinavian Journal of Psychology, 41*(4), 287–296.

Bowers, P. N., Kirby, J. R., & Deacon, S. H. (2010). Effects of morphological instruction on literacy skills: A systematic review of the literature. *Review of Educational Research, 80*(2), 144–179.

Carlisle, J. F. (1995). Morphological awareness and early reading achievement. In L. B. Feldman (Ed.), *Morphological aspects of language processing* (pp. 189–210). Erlbaum.

Carlisle, J. F. (2000). Awareness of the structure and meaning of morphologically complex words: Impact on reading. *Reading and Writing: An Interdisciplinary Journal, 12*(3), 169–190.

Carlisle, J. F. (2007). Fostering morphological processing, vocabulary development, and reading comprehension. In R. K. Wagner, A. E. Muse, & K. R. Tannenbaum (Eds.), *Vocabulary acquisition: Implications for reading comprehension* (pp. 78–103). Guilford.

Carlisle, J. F. (2010). Effects of instruction in morphological awareness on literacy achievement: An integrative review. *Reading Research Quarterly, 45*(4), 464–487. https://doi.org/10.1598/RRQ.45.4.5

Carlisle, J. F., & Katz, L. (2006). Effects of word and morpheme familiarity on reading of derived words. *Reading and Writing: An Interdisciplinary Journal, 19*(7), 669–693.

Carlisle, J. F., & Kearns, D. M. (2017). Learning to read morphologically complex words. In K. Cain., D. L. Compton, & R. K. Parilla (Eds.), *Theories of reading development* (pp. 192–214). John Benjamins Publishing Company.

Casalis, S., Colé, P., & Sopo, D. (2004). Morphological awareness in developmental dyslexia. *Annals of Dyslexia, 54*(1), 114–138.

Champion, A. (1997). Knowledge of suffixed words: A comparison of reading disabled and nondisabled readers. *Annals of Dyslexia, 47*(1), 28–55.

Coxhead, A. (n.d.). *The Academic Word List*. Victoria University of Wellington. https://www.wgtn.ac.nz/lals/resources/academicwordlist

Crosson, A. C., McKeown, M. G., Moore, D. W., & Ye, F. (2018). Extending the bounds of morphology instruction: Teaching Latin roots facilitates academic word learning for English learner adolescents. *Reading and Writing 32*(3), 1–39. https://doi.org/10.1007/s11145-018-9885-y

Deacon, S. H., & Kirby, J. R. (2004). Morphological awareness: Just "more phonological"? The roles of morphological and phonological awareness in reading development. *Applied Psycholinguistics, 25*(2), 223–238.

Deacon, S. H., Kirby, J. R., & Casselman-Bell, M. (2009). How robust is the contribution of morphological awareness to general spelling outcomes? *Reading Psychology, 30*(4), 301-318. https://doi.org/10.1080/02702710802412057

DyslexiaHelp. (2022). *Morphological awareness*. Dyslexia Help at the University of Michigan. http://dyslexiahelp.umich.edu/professionals/dyslexia-school/morphological-awareness

Elbro, C., & Arnbak, E. (1996). The role of morpheme recognition and morphological awareness in dyslexia. *Annals of Dyslexia, 46*(1), 209–240.

Florida Center for Reading Research (2022). *Fourth and fifth grade student center activities*. The Florida State University and Florida Department of Education. https://fcrr.org/student-center-activities/fourth-and-fifth-grade

Foorman, B. R., Petscher, Y., & Bishop, M. D. (2012). The incremental variance of morphological knowledge to reading comprehension in grades 3–10 beyond prior reading comprehension, spelling, and text reading efficiency. *Learning and Individual Differences, 22*(6), 792–798. https://doi.org/10.1016/j.lindif.2012.07.009

Goodwin, A. P., & Ahn, S. (2010). A meta-analysis of morphological interventions: Effects on literacy achievements of children with literacy difficulties. *Annals of Dyslexia, 60*, 183–208.

Goodwin, A., Lipsky, M., & Ahn, S. (2012). Word detectives: Using units of meaning to support literacy. *Reading Teacher, 65*(7), 461–470. https://doi.org/10.1002/TRTR.01069

Henry, M. K. (2003). *Unlocking literacy: Effective decoding & spelling instruction*. Brookes.

Hogan, T. P. (Host). (2020, August 10). Morphology and morphological awareness (No. 33) [Audio podcast episode]. In *SeeHearSpeak*. https://anchor.fm/tiffany-hogan/episodes/Episode-33-Morphology-and-morphological-awareness-with-Julie-Wolter-ehrcm3

James, E., Currie, N. K., Tong, S. X., & Cain, K. (2021). The relations between morphological awareness and reading comprehension in beginner readers to young adolescents. *Journal of Research in Reading, 44*(1), 110–130. https://doi.org/10.1111/1467-9817.12316

Kearns, D. M. (2022). *Phinder*. https://devinkearns.com/phinder/

Kearns, D. M., & Whaley, V. M. (2019). Helping students with dyslexia read long words: Flexible strategies using syllables and morphemes. *TEACHING Exceptional Children, 51*, 212-225. https://doi.org/10.1177/0040059918810010

Kirby, D. J. R., & Bowers, P. N. (2012). *Morphology works*. Literacy and Numeracy Secretariat & Ontario Association of Deans of Education. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1050.3965&rep=rep1&type=pdf

Kieffer, M. J., & DiFelice Box, C. (2013). Derivational morphological awareness, academic vocabulary, and reading comprehension in linguistically diverse sixth graders. *Learning and Individual Differences, 24*, 168-175. https://doi.org/10.1016/j.lindif.2012.12.017

Kirby, J. R., & Bowers, P. N. (2017). Morphological instruction and literacy: Binding phonological, orthographic, and semantic features of words. In K. Cain, D. L. Compton, & R. K. Parilla (Eds.), *Theories of reading development* (pp. 437-462). John Benjamins Publishing Company.

Kuo, L., & Anderson, R. C. (2006). Morphological awareness and learning to read: A cross-language perspective. *Educational Psychologist, 41*(3), 161-180.

Lane, H. B., Gutlohn, L., & van Dijk, W. (2019). Morpheme frequency in academic words: Identifying high-utility morphemes for instruction. *Literacy Research and Instruction, 58*(3), 184-209. https://doi.org/10.1080/19388071.2019.1617375

Lesaux, N. K., Kieffer, M. J., Faller, S. E., & Kelley, J. G. (2010). The Effectiveness and Ease of Implementation of an Academic Vocabulary Intervention for Linguistically Diverse Students in Urban Middle Schools. *Reading Research Quarterly, 45*(2), 196–228. https://doi-org.proxy.cc.uic.edu/10.1598/RRQ.45.2.3

Levesque, K. C., Breadmore, H. L., & Deacon, S. H. (2021). How morphology impacts reading and spelling: Advancing the role of morphology in models of literacy development. *Journal of Research in Reading, 44*(1), 10–26. https://doi.org/10.1111/1467-9817.12313

McBride-Chang, C., Cho, J.-R., Liu, H., Wagner, R. K., Shu, H., Zhou, A., Cheuk, C. S.-M., & Muse, A. (2005). Changing models across cultures: Associations of phonological awareness and morphological structure awareness with vocabulary and word recognition in second graders from Beijing, Hong Kong, Korea, and the United States. *Journal of Experimental Child Psychology, 92*(2), 140–160. https://doi.org/10.1016/j.jecp.2005.03.009

McLeod, A. N., & Apel, K. (2015). Morphological awareness intervention: Study of a child with a history of speech and language impairment. *Communication disorders quarterly, 36*(4), 208-218. https://doi.org/10.1177/1525740114560371

McLeskey, J., Barringer, M-D., Billingsley, B., Brownell, M., Jackson, D., Kennedy, M., Lewis, T., Maheady, L., Rodriguez, J., Scheeler, M. C., Winn, J., & Ziegler, D. (2017, January). *High-leverage practices in special education*. Council for Exceptional Children & CEEDAR Center.

Moats, L. (2009). Knowledge foundations for teaching reading and spelling. *Reading and Writing: An Interdisciplinary Journal, 22*(4), 379–399. https://doi.org/10.1007/s11145-009-9162-1

Nagy, W. E., & Anderson, R. C. (1984). The number of words in printed school English. *Reading Research Quarterly, 19*(3), 304-330.

Nagy, W., Berninger, V. W., & Abbott, R. D. (2006). Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle-school students. *Journal of Educational Psychology, 98*(1), 134–147. https://doi.org/10.1037/0022-0663.98.1.134

Nagy, W., Berninger, V., Abbott, R., Vaughan, K., & Vermeulen, K. (2003). Relationship of morphology and other language skills to literacy skills in at-risk second-grade readers and at-risk fourth-grade writers. *Journal of Educational Psychology, 95*(4), 730–742. https://doi.org/10.1037/0022-0663.95.4.730

Nunes, T., & Bryant, P. (2006). Improving literacy by teaching morphemes. Routledge.

Nunes, T., Bryant, P., & Bindman, M. (2006). The effects of learning to spell on children's awareness of morphology. *Reading and Writing, 19*(7), 767–787. https://doi.org/10.1007/s11145-006-9025-y

Perfetti, C. (1992). The representation problem in reading acquisition. In P. B. Gough, L. C. Ehri, & R. Treiman (Eds.), *Reading acquisition* (pp.145-174). Erlbaum.

Perfetti, C. A., & Hart, L. (2002). The lexical quality hypothesis. In L. Verhoeven, C. Elbro, & P. Reitsma (Eds.), *Precursors of functional literacy* (pp. 67-86). John Benjamins.

Ramsden, N. (2013, January). Word building and spelling experiments in English morphology. http://www. neilramsden.co.uk/spelling/index.html

Reed, D. K. (2008). A synthesis of morphology interventions and effects on reading outcomes for students in grades k–12. *Learning Disabilities Research & Practice, 23*(1), 36–49. https://doi.org/10.1111/j.1540-5826.2007.00261.x

Roman, A. A., Kirby, J. R., Parrila, R. K., Wade-Woolley, L., & Deacon, S. H. (2009). Toward a comprehensive view of the skills involved in word reading in Grades 4, 6, and 8. *Journal of Experimental Child Psychology, 102*(1), 96–113.

Seidenberg, M. S. (2005). Connectionist models of word reading. *Current Directions in Psychological Science, 14*(5), 238-242. https://doi.org/10.1111/j.0963-7214.2005.00372.x

Spiro, R. J., Vispoel, W. P., Schmitz, J. G., Samarapungavan, A., & Boerger, A. E. (1987). Knowledge acquisition for application: Cognitive flexibility and transfer in complex content domains. In B. K. Britton & S. M. Glynn (Eds.), *Executive control processes in reading* (pp. 177–199). Erlbaum.

Tainturier, M., & Rapp, B. (2001). The spelling process. In B. Rapp (Ed.), *The handbook of cognitive neuropsychology: What deficits reveal about the human mind* (pp. 263-289). Psychology Press.

Truckenmiller, A. J., Park, J., Dabo, A., & Wu Newton, Y.-C. (2019). Academic language instruction for students in grades 4 through 8: A literature synthesis. *Journal of Research on Educational Effectiveness, 12*(1), 135–159. https://doi.org/10.1080/19345747.2018.1536773

Uccelli, P., Barr, C. D., Dobbs, C. L., Galloway, E. P., Meneses, A., & Sánchez, E. (2015). Core academic language skills: An expanded operational construct and a novel instrument to chart school-relevant language proficiency in preadolescent and adolescent learners. *Applied Psycholinguistics, 36*(5), 1077–1109. https://doi.org/10.1017/S014271641400006X

Vaughn, S., Gersten, R., Dimino, J., Taylor, M. J., Newman-Gonchar, R., Krowka, S., Kieffer, M. J., McKeown, M., Reed, D., Sanchez, M., St. Martin, K., Wexler, J., Morgan, S., Yañez, A., & Jayanthi, M. (2022). *Providing reading interventions for students in grades 4–9* (WWC 2022007). National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/WWC-practice-guide-reading-intervention-full-text.pdf

Wilson, B. A. (2018). Instruction for older students with a word-level reading disability. In J. R. Birsh, & S. Carreker (Eds.), *Multisensory teaching of basic language skills* (4th ed.). Paul H. Brooks Publishing.

Wolter, J. A., & Collins, G. (2017). Morphological awareness intervention for students who struggle with language and literacy. *Perspectives on Language and Literacy, 43*(2), 17-22. https://mydigitalpublication.com/publication/?i=398575&article_id=2757854&view=articleBrowser&ver=html5

Wolter, J. A., & Green, L. (2013). Morphological awareness intervention in school-age children with language and literacy deficits. *Topics in Language Disorders, 33*(1), 27-4. https://doi.org/10.1097/TLD.0b013e318280f5aa

Zeh, N. (2016). *Teaching morphology to improve literacy: A guide for teachers*. Cambridge University Press. https://www.uwo.ca/fhs/lwm/teaching/dld2_2017_18/Zeh_Morphological-Awareness.pdf

NATIONAL CENTER FOR
LEADERSHIP
IN INTENSIVE INTERVENTION