Spelling Assessment and Instruction: An 'ART PhOrM'

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Introduction

Spelling is a written expression of word-level language and a complex word-formation problem solving process. Mastery of spelling gives writers the confidence to express their voice and communicate effectively while facilitating vocabulary growth and enhancing word recognition and reading comprehension. Moreover, it is an important literacy skill that can afford opportunities for lifelong learning and future employment.

This chapter explores developing efficient spelling skills. As a morphophonemic language, Standard English words are structured through systematic mappings between letters, **phonemes** (speech sounds), and **morphemes** (the smallest units of meaning). Standard English spelling is complex and multifaceted. To master it, writers must understand the linguistic structure of words.

This chapter elaborates on the three linguistic word forms that are fundamental to teaching and learning Standard English spelling (Daffern et al., 2015):

i) **Phonology** (Ph) - the study of how speech sounds are structured
ii) **Orthography** (Or) – the study of conventional letter patterns to represent speech sounds
iii) **Morphology** (M) – the study of the smallest meaningful lexical parts and how they combine

From these abbreviations, we derive the acronym, **PhOrM** to represent the spelling components that underpin **Triple Word Form Theory**.

In addition to **PhOrM**, the study of word origins (etymology) may help the writer learn new or technical words. Thus, word knowledge entails knowing and remembering the meaning(s), pronunciation and spelling of words and the ability to use words in a range of semantic contexts. It also includes learning how to use and combine morphemes to spell morphologically complex words, such as *unwilling*, *illogically*, or *decentralisation*.

We can teach **PhOrM** using a multi-tiered approach, driven by data from norm-referenced spelling error analysis measures and by monitoring progress of learning, captured by the acronym "ART":

(i) **Acquisition** (A);
(ii) **Retention** (R); and
(iii) **Transfer** (T).

Thus, the name of this chapter, *Spelling Assessment and Instruction: An 'ART PhOrM'* combines these two acronyms, **PhOrM** and **ART**, to create a way to signal evidence-informed spelling pedagogy for mainstream classroom contexts (Daffern & Fleet, 2021;

Daffern et al., 2024; Law et al., 2022). This chapter also provides practical examples of structuring explicit, targeted spelling lessons and teaching the importance of how written words function in their semantic contexts.

The importance of learning to spell

Learning to spell is a critical part of becoming literate. Spelling ability has been found to be a strong predictor of accurate and fluent word-reading (Ouellette et al., 2017; Treiman et al., 2019), reading comprehension (Murphy & Justice, 2019) and compositional writing (Daffern et al., 2017). If spelling skills are not well-developed, reading and writing can become cognitively arduous (Daffern & Mackenzie, 2020) and thus, stressful. On the other hand, proficient spellers can devote their cognitive resources to generating ideas, selecting precise and diverse vocabulary, and ensuring semantic cohesion and precision (Daffern, 2024b; Hayes & Berninger, 2014; Sumner et al., 2016). They do not need to frequently pause to consider how to spell words when creating written texts (Sumner et al., 2013).

As with writing skills, reading is cognitively complex, requiring secure **PhOrM** knowledge (Daffern, 2024b; Daffern et al., 2017; Kim, 2020). The importance of **PhOrM** component spelling skills is illustrated through data from the Australian mainstream education context, namely testing of spelling, reading and writing in the NAPLAN. Statistically significant correlations are shown in the matrix in Table 1: the higher the Spearman correlation score, the stronger the relationship. For example, the highest correlations are evident between the **PhOrM** components as measured by Daffern's Components of Spelling Test (CoST), a norm-referenced dictation test using spelling error analysis, and with ACARA's (2018) NAPLAN Spelling Test (a test of proofreading and editing spelling).

Table 1. Relationships between PhOrM spelling components and NAPLAN Reading, Writing and Spelling[1]

PhOrM spelling components (measured by CoST)	NAPLAN Reading	NAPLAN Writing	NAPLAN Spelling
Phonology (Ph)	.441**	.305**	.637**
Orthography (O)	.444**	.349**	.644**
Morphology (M)	.639**	.513**	.838**

Note: Spearman correlations = ** significant at 0.01 level

As can be seen in Table 1, all **PhOrM** spelling components correlate with NAPLAN Reading, Writing and Spelling. Of the three components, the morphological component of spelling has the highest correlations across NAPLAN Reading, Writing and Spelling. This suggests that morphological knowledge is a particularly important aspect of learning to read, spell and create written texts.

[1] Year 5 students aged 10- to 11-years (*n*=320) from three schools (ACT, Australia) were randomly selected from stratified random bands (low, middle and high) based on the Index of Community Socio-educational Advantage (ICSEA); Data collected in 2018 - NAPLAN Tests (ACARA, 2018) and CoST: Pseudoword Tests (Daffern, 2021).

Using Triple Word Form Theory as a framework for spelling assessment and instruction

Triple Word Form Theory is grounded in neurocognitive and behavioural research indicating that **PhOrM** components can be explicitly taught from the beginning of learning to write (Daffern & Fleet, 2021; Daffern et al., 2015; Daffern & Ramful, 2020; Richards et al., 2006). Through explicit and targeted teaching, students can learn to coordinate, or 'cross-map', the **PhOrM** components with increasing efficiency and accuracy. When a writer has a solid understanding of **PhOrM** and knows how to integrate word forms efficiently, they can build durable, multifaceted representations of words. When these word representations are accessed directly and automatically, the writer has established an autonomous and durable orthographic lexicon, resulting in effortless spelling and word-reading (Richards et al., 2009). This can be achieved by regularly teaching the **PhOrM** properties of words, not just in isolation but also in sentence-level contexts. Explicit and targeted spelling instruction, combined with ample opportunities for students to practice spelling words in a variety of sentence constructions is an effective instructional approach (Daffern, 2024b; Daffern & Fleet, 2021; Daffern et al., 2024; Graham & Santangelo, 2014; Law et al., 2022; Ouellette, 2010).

Explicit instruction must also be responsive to the needs of each learner, and this requires systematically identifying gaps in knowledge for each spelling component. Differentiation is essential for optimal learning in spelling. A pre-made scripted program of instruction, designed without knowing the learner will not suffice.

You can learn more about the cognitive underpinnings of spelling and its instructional implications here

__Teaching the phonological component of spelling (Ph)__

Phonology is the study of how speech sounds are structured. Teaching the phonological component includes teaching students to recognise that a phoneme, the smallest unit of speech, can be mapped to a grapheme, namely, a letter or sequence of letters. For example, the word c-a-t has three single-letter graphemes to represent three corresponding phonemes. The word ch-o-m-p has four graphemes that map to four phonemes: <ch> is a consonant digraph (two letters that represent one phoneme) and <o>, <m> and <p> are single-letter graphemes. As well as recognising graphemes and phonemes in English, the more phonemes a word has, the more difficult it can be to spell, even for high-performing spellers in the upper primary school years (Daffern, 2017; Daffern & Ramful, 2020). This means that phonological working memory can impact spelling accuracy.

Phonological skills to explicitly teach include:

- syllabification (segmenting multisyllabic words into syllables, highlighting that each syllable contains a vowel phoneme)
- blending and segmenting words into phonemes
- distinguishing articulatory differences between phonemes
- isolating and identifying specific phonemes in words

For beginning writers, instruction should focus on blending and segmenting words with two and three phonemes comprising frequently occurring single-letter graphemes and common digraphs. Instruction should continue by gradually increasing the phonological complexity of words taught, that is, teaching words with more syllables and phonemes, while ensuring word selection builds vocabulary knowledge.

Some students will need more consolidation than others. Consolidation tasks should include connecting the teaching of target words with grammar or semantic concepts. Activities should also extend the learning as needed.

Figures 1 and 2 illustrate sample tasks suitable for beginning spellers. The tasks involve segmenting and blending words with the /p/ phoneme represented by the grapheme <p>. The learning objective is for students to segment words into syllables (where applicable) and phonemes, and to identify where the /p/ phoneme can be heard in each word. The series of tasks shown in Figure 1 are for support and predominantly include 3-phoneme words. An extension version is shown in Figure 2: words contain more phonemes, and the tasks have increased phonological and semantic complexities.

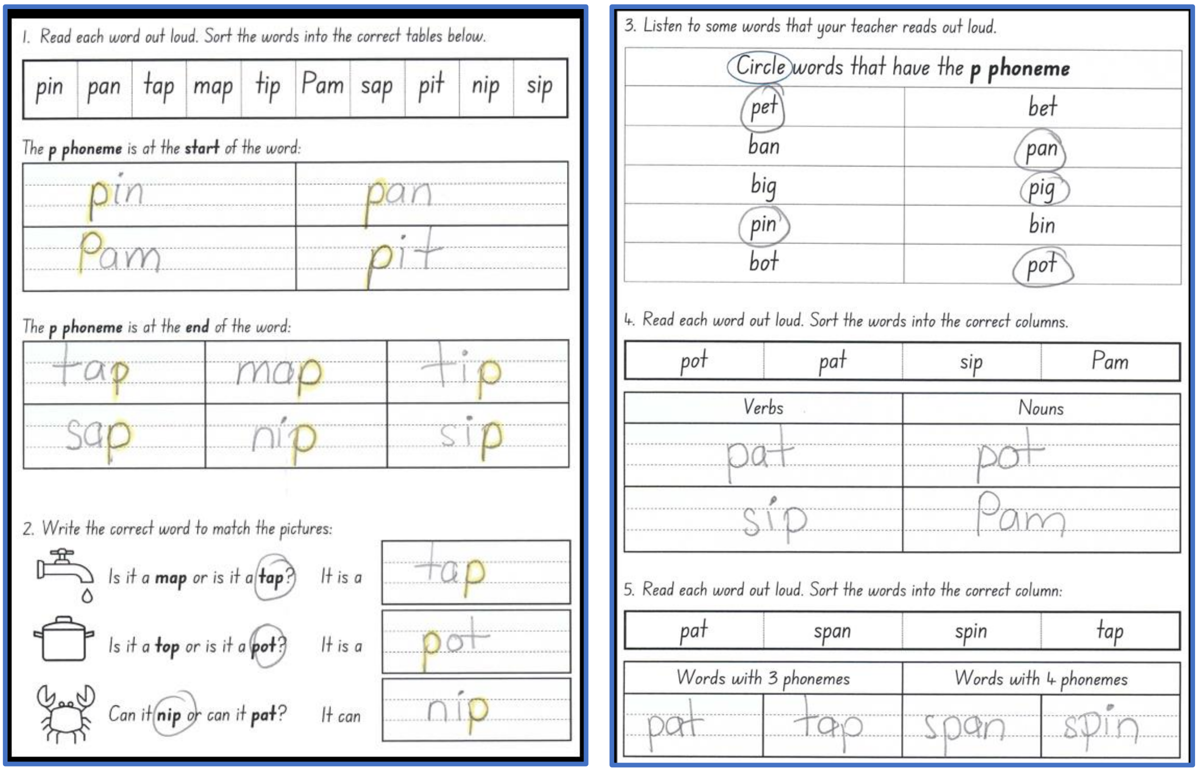

Figure 1 Phonological component: A support task on the single-letter grapheme, <*p*>.
Credit line. Used with permission from Daffern, T. (2023). *CoSTEY Dashboard: Phonological component (tailored activity).* Literacy Education Solutions Pty Ltd. Available at www.tessadaffern.com

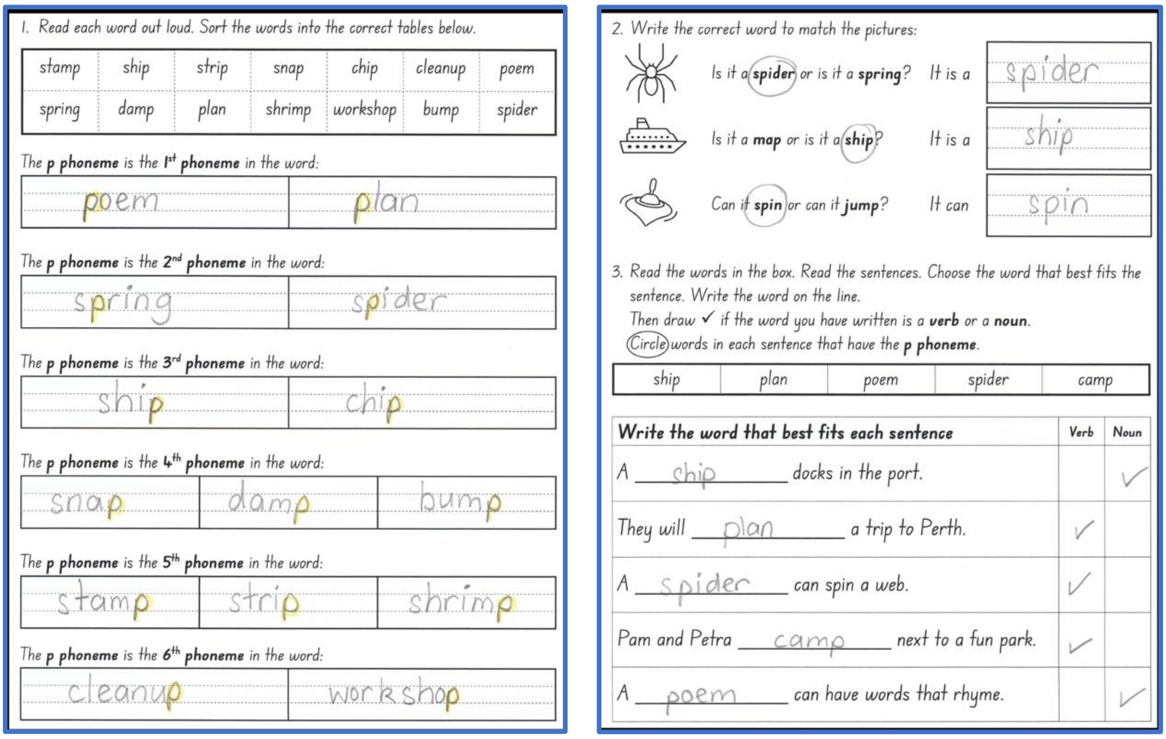

Figure 2 Phonological component: An extension task on the single-letter grapheme, <*p*>.
Credit line. Used with permission from Daffern, T. (2023). *CoSTEY Dashboard: Phonological component (tailored activity).* Literacy Education Solutions Pty Ltd. Available at www.tessadaffern.com

Lessons focussed on the phonological component of spelling can be short, sharp and focussed, serving as a primer for orthography and morphology. Priming is a way of scaffolding the learning. It ensures students can say the words, know what the words mean, and can segment the words into syllables and phonemes accurately. It helps to free-up cognitive space so that students can also learn about the orthographic and morphological properties of those 'primed' words.

Teaching the orthographic component of spelling (Or)

Proficient spellers have heightened sensitivity to plausible, or 'legal', graphemes for individual phonemes (Daffern, 2024a). Selecting a plausible grapheme for a phoneme in a word involves knowing the positional constraints of phoneme-correspondences. For example, when spelling a word that ends with the diphthong /ay/ in a word like 'say', it is not plausible to use the digraph <ai> in the final position of a word. However, the digraph <ay> is a plausible grapheme, given the position of the corresponding phoneme in the word.

To help manage the cognitive load of the learner, judicious word selection for instructional focus is critical. The selected words should help to extend and deepen existing vocabulary knowledge. A small number of graphemes for one phoneme should be taught at one time. For some students, one or two graphemes for one phoneme will suffice, for example, <ay> and <ai> for the diphthong /ay/. The following points of differentiation can be considered when selecting words and graphemes to teach:

You can access more about graphemes for the diphthong /ay/ here

• grapheme quality, or type of grapheme: as a starting point, select high frequency graphemes for a corresponding phoneme (e.g., <ay> as in *play*, <ai> as in *rain* and <a_e> as in *make*) and proceed to less common graphemes for the same phoneme (e.g., the digraph <-et>, in the final position of French derived words such as *ballet* and *gourmet*)

• grapheme quantity/variety: the more graphemes that are used in a lesson, the greater the cognitive load for the learner

• length of words: words with more syllables and phonemes tend to be more difficult due to phonological working memory constraints

• position of grapheme in words: as a starting point, select words where the grapheme occurs in the most common position, i.e. initial, medial or final position, for example, the split digraph <a_e> is more common in the medial position of words, as in *make*, than in the initial position of words, as in *ate*

• quantity of words: the more words that are included in each lesson, the less likely the learner will be able to remember and spell all those words

Examples of orthographic skills to explicitly teach are listed in Figure 3. There is no research to date that indicates an optimal sequence for teaching orthographic skills. Broadly, teaching words with long vowels may need greater instructional dosage because of the vast ranging graphemes that exist for long vowels in English. However, instructional priorities should primarily be guided by the needs of the students, informed by systematic error analysis.

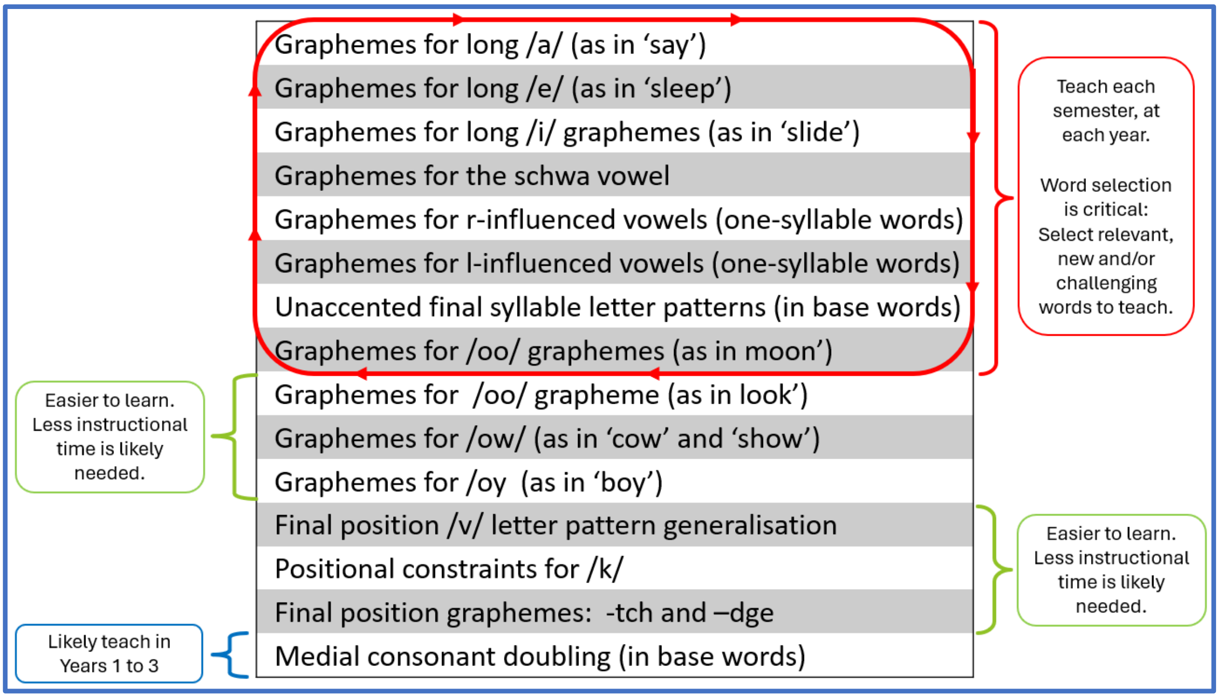

Figure 3 Teaching orthographic subskills

Teaching the morphological component of spelling (M)

Morphemes are the smallest units of meaning in words. In multimorphemic English words, a number of meanings are "packed in" through morphemes. For example, the word *unhappiness* consists of three morphemes:

UN + HAPPY + NESS

indicating "not" + HAPPY + the state/noun

Explicitly teaching the meaning, function and spelling of morphemes is central to the morphological component of spelling. This includes explaining generalisations for combining morphemes. Examples of morphological concepts to teach include:

- base words, or free morphemes, such as *run, happy, slow*
- prefixes, or bound morphemes, are added to the start of base words or roots, such as *dis*- in *disrespect,* and *un-* in *unhappy*
- inflected suffixes, also bound morphemes, are added to the end of base words or roots to indicate tense (e.g., *-s* in *skips*, *-ing* in *skipping* and *-ed* in *skipped*), plurality (e.g., *-s* in *tables*, and *-es* in *boxes*), and as comparative and superlative affixes (e.g., *-er* in *happier* and *-est* in *happiest*)
- derivational suffixes, bound affixes added to the end of base or roots to change the part of speech such as *respect* (noun or verb) to *respectful* (adjective)*, happy* (adjective) to *happiness* (noun)*, slow* (adjective) to *slowly* (adverb)
- roots, bound morphemes, largely of Greek and Latin origin, such as *hydro, aud, bio, auto*
- homophones, words with the same sound but different meaning and spelling, such as *bear/bare, rain/rein/reign*

Explicitly teaching the morphological regularities of the English writing system is just as important as teaching phoneme-grapheme correspondences. It should commence as soon as students have been taught enough graphemes to read and write simple consonant-vowel-consonant (CVC) words. For example, students can be taught how to add inflected suffixes to CVC base words that don't require any change, beginning with plural markers (e.g., *cat-cats*) and tense markers (e.g., *sit-sits*). In a cumulative manner, students can then be taught generalisations for each suffix. Students should also be given opportunities to connect their learning with words they encounter in a range of texts, and to use taught words in sentence-level contexts.

You can watch a demonstration lesson of the inflected suffix *-ing* here

Explicit teaching should begin with inflected suffixes before proceeding to derivational suffixes. Likewise, prefixes that don't require any treatment when affixed to base words (for example, *ex-*, *un-*) can be taught before assimilated prefixes (for example, *ad-*, *com-*, *in-*) as they are easier to learn (Daffern, 2024a).

You can watch a demonstration lesson of the derivational suffix *-ion* here

As students proceed through school, teaching morphology becomes increasingly crucial because the types of texts that older students encounter tend to contain a higher proportion of morphologically complex words, and especially words with derivational suffixes (Dawson et al., 2023). Knowledge of derivational suffixes tends to develop over a more protracted period relative to inflected suffixes (Daffern, 2017; Dawson et al., 2018).

You can watch a demonstration lesson of the derivational suffixes *-ance* and *-ence* here

Guided teaching activities are important as they enable teachers to support students to develop morphological generalisations. For example, when students have acquired some knowledge of a particular morphological subskill, teachers can guide students to identify and use metalanguage to explain morphological knowledge. Working with a model or mentor text will also provide contextualised examples of these morphological elements that occur in English.

Teaching the morphological component of spelling should be combined with grammar instruction since morphemes are related to sentence-level knowledge. Understanding how tense and parts of speech are indicated through spelling conventions helps to understand how to use the words in texts and in relation to other words.

Morphological instruction is critical for all students because many Standard English words have consistent morphological structures. Despite this, learning to spell is challenging and takes time because English has a *deep orthography*: the relationship between phonemes and graphemes is not always consistent. English is unlike languages with *shallow* or *transparent* orthographies such as Spanish, Italian and many Pasifika languages, where each phoneme reliably corresponds to a specific grapheme. For example, in Standard English spelling, the graph <a> can represent multiple phonemes, as in *cat* and *father*. Similarly, the quadgraph <ough> can be pronounced in several ways, as in *though*, *through*, and *thought*. It also can be used to represent two phonemes, as in *rough*. This complexity of the English language stems from its etymology. As such, students who know about the orthographic structures of other languages may be able to capitalise on their knowledge when learning the English orthography.

Furthermore, not all languages use affixes (prefixes and suffixes) to mark grammar and meaning, such as tense or plurality, in the same way or to the same extent as English. For example, in Standard English, verbs are often modified with suffixes to indicate tense (e.g., *walks, walked*), and nouns take plural suffixes (e.g., *cats, boxes*). In contrast, some other languages often use separate words, repeated words, or context instead of affixes to convey these meanings. As such, explicitly teaching the morphological structure of English words in syntactic contexts is especially important for students learning English as an additional language or dialect.

Teaching cross-mapping

Students should also be taught how to combine or 'cross-map' **PhorM** as a strategy when spelling. An example of a student's cross-mapping response using the word *presence* is illustrated in Figure 4.

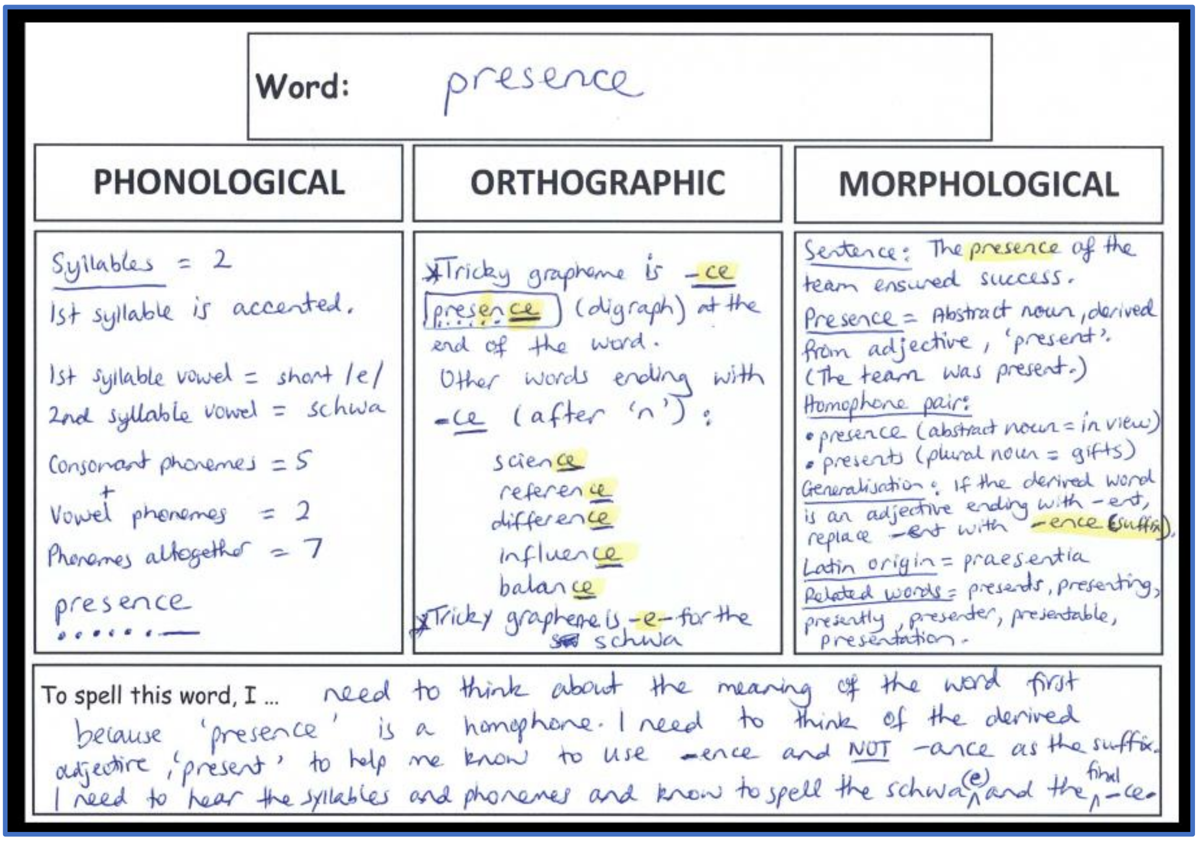

Figure 4 Cross-mapping written sample using the word '*presence*'

First, the student analyses the phonological properties of the word. This is followed by an analysis of the orthographic features of the word and then the morphological features of the word. The student also applies the word and/or related words in written sentences. Finally, the student reflects on the skills or strategies that are required to spell the word correctly. A cross-mapping task can serve as consolidation or as an opportunity for students to apply taught **PhOrM** skills to a new or complex word that they encounter when reading or learning about a topic of study in any discipline. It can also support depth and breadth of vocabulary learning.

Using a multi-tiered system of support

A multi-tiered system of support is one that relies on high-quality assessment and instruction (AERO, 2024) and this can be applied to spelling. The system considers the needs of *all* learners in a class. Instructional tiers are:

- **Tier 1 instruction:** explicit, modelled teaching, delivered to all students in a given class
- **Tier 2 instruction:** delivered through guided instructional practices to smaller groups within the class, in addition to Tier 1 instruction, but still aligned to Tier 1 content
- **Tier 3 instruction:** delivered as needed to very low-performing and high-performing spellers through further intensified instruction (i.e., more dosage:

duration and frequency) and/or extension (i.e., task complexity), possibly using a one-to-one support configuration

Multi-tiered spelling instruction requires nuanced and flexible implementation because assigning students to instructional tiers may need to differ for each spelling component (phonology, orthography, morphology). Grouping students into tiers will also likely need to be fluid and responsive because of individual variances in response to taught component skills.

Assigning students to particular groupings can be done through valid and reliable spelling error analysis. A spelling error analysis measure that has validity and reliability is one that has undergone rigorous psychometric testing. Error analysis involves identifying the types of spelling mistakes that students make. For example, if a student incorrectly spells suffixed verbs such as *hurries* as *hurriz* or *carries* as *carryes*, there is evidence of a breakdown in morphological knowledge, indicating a need to explicitly teach the tense-marking suffix *-es* and how to treat base verbs when adding this tense marking suffix.

You can watch a webinar about implementing a multi-tiered approach here

Monitoring and responding to progress

Regular progress monitoring of taught spelling skills might consider three broad phases of **ART** (Burns, 2021). For example, the teacher might notice that the novice writer struggles to learn a skill through whole class teaching, say, to generalise adding the suffix *-ing* to base verbs, indicating that skill acquisition **(A)** has not yet occurred. This means more explicit teaching and modelling aligned to that skill is required. This might include explaining generalisations for adding the suffix *-ing* to base verbs accompanied with worked examples such as *ride-riding*.

If the learner has acquired knowledge of that skill, but then struggles to remember it, retention **(R)** is the issue. In this instance, more dosage (repetition) in various contexts is required and the teacher might offer short, daily review activities of taught generalisations. Activities may include matching base words with their suffixes and grouping those words to fit taught generalisations, or a partner game of tic-tac-toe using words that fit two spelling generalisations to be learnt.

Finally, if the learner has acquired knowledge of a skill and they can retain it but struggle to generalise it to a range of writing concepts, transfer **(T)** is the issue. This suggests that the teacher needs to provide opportunities for the student to transfer that skill to a range of writing contexts, such as writing and/or manipulating verbs with tense marking suffixes in cloze passages, creating sentences and other extended written texts. **ART** is observed when students demonstrate a consistent, effortless and accurate transfer of learning to a range of writing contexts. This might include using metalanguage to explain the linguistic properties of taught words (Daffern, 2016).

You can watch examples of rich talk and spelling with young students here

For sustained and impactful **ART**, explicit spelling instruction should be integrated with:

• oral language (e.g., using target words in spoken sentences and using metalanguage to explain how words are structured)

• reading (e.g. by asking students to be 'word detectives', identifying words in texts and sorting them according to specific linguistic properties)

• writing (e.g., using specific sentence structures to write target words)

In the presence of explicit and carefully scaffolded teaching, spelling instruction can be integrated with oral language, reading and writing from the first year of school.

Effective spelling instruction involves:

• using standardised, valid and reliable spelling error analysis data for comparative, longitudinal and diagnostic assessment purposes (Daffern & Fleet, 2021), to identify students who need additional support and/or extension for each spelling **PhOrM** component

• regularly tracking progress of taught skills by monitoring all phases of learning using **ART**, ensuring immediate and sustained impact, and flexibly configuring differentiated instruction for each spelling component in response to identified gaps and strengths

• sequencing content in a cumulative and spaced manner, both horizontally across the **PhOrM** components each week or fortnight (see Figure 5) and vertically over multiple weeks – three to four 20 to 30-minute lessons each week – and explicitly teaching and providing guided practice that leads to students' independent application at all phases of **ART**

• providing ample opportunity to connect taught spelling skills to semantic contexts when saying, reading and writing sentences (Daffern et al., 2024)

• providing immediate and corrective feedback as often as possible

You can access a sample of a Year 5/6 lesson sequence using PhOrM here

Implementing a PhOrM Instructional routine

A PhOrM instructional routine aligns with Triple Word Form Theory. Figure 5 offers an example of this routine. It illustrates a broad sample structure for a series of lessons that may occur over the course of one or two weeks. Across the lessons, the teacher may repeatedly use a group of carefully selected words for cumulative and spaced learning. This structure should be used flexibly, in response to the complexity of concepts being taught and learner needs.

In Focus 1, the teacher may provide one or two lessons that focus on the phonological properties of a selection of words. Focus 1 can also serve as a primer, ensuring students can say the words out loud and have opportunities to discuss the meaning(s) of the words. For example, students are explicitly taught to segment words with the /ay/ diphthong into syllables and phonemes, such as in *locate* (two syllables and five phonemes) and *location* (three syllables and seven phonemes). They identify where the long /a/ phoneme can be heard in each word (the /ay/ diphthong is the fourth phoneme in the word *locate*). Students also use some of those words in spoken sentences, and they apply taught handwriting skills, such as joined letters to record those words.

In Focus 2, the teacher builds on the learning by providing one or two lessons on the orthographic features of some of the previously introduced words. Specifically, the teacher draws attention to a grapheme in each word. For example, students identify and sort words by graphemes for the /ay/ diphthong (e.g., words with the split digraph <a_e> as in *locate* are grouped together). The students also use those words in various written sentence-level contexts.

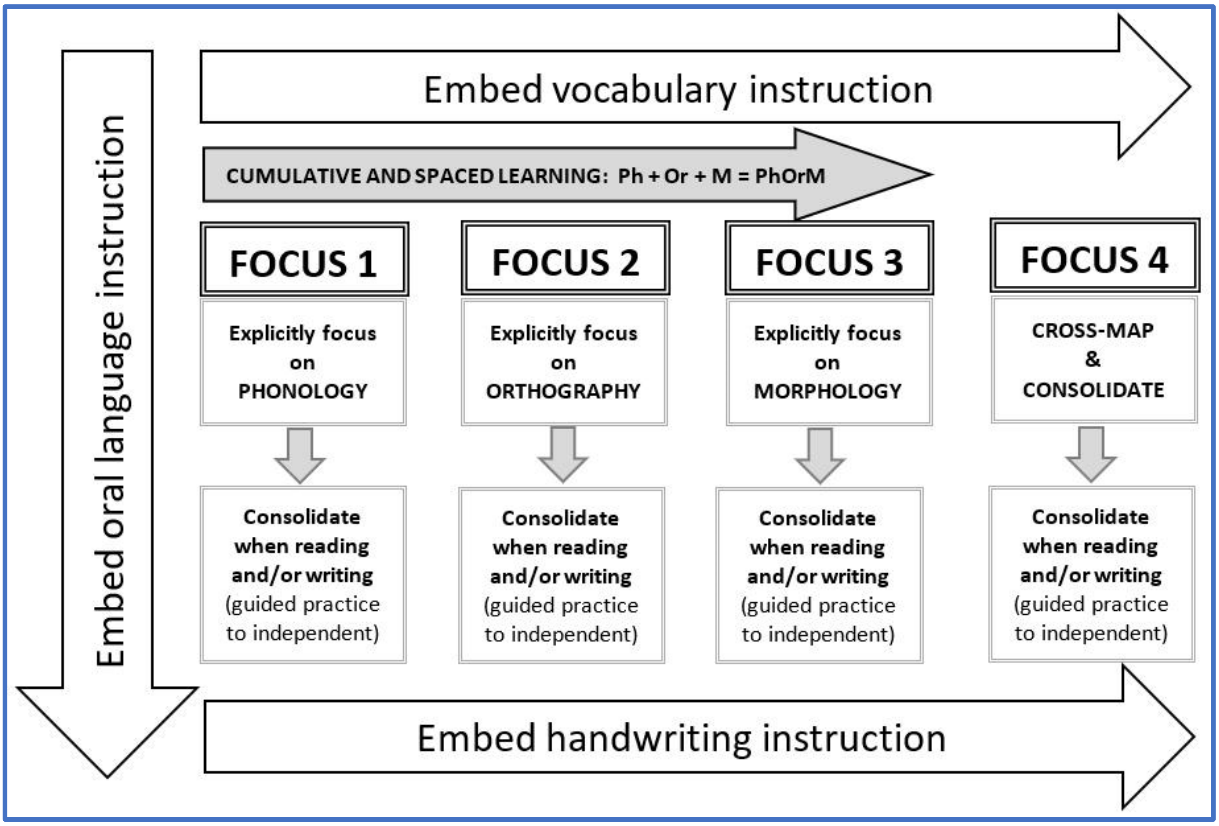

Figure 5 PhOrM instructional routine

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In Focus 3, the teacher shifts attention to the morphology of the previously taught words. The teacher may need to dedicate several lessons on teaching generalisations for adding the derivational suffix -*ion* to form abstract nouns from verbs (e.g., *locate* - *location*). At this point in the instructional routine, other words may be used to teach this suffix. The students may also be taught how to nominalise written sentences using some of the target words.

You can access a prerecorded webinar about implementing a PhOrM instructional routine based on Triple Word Form Theory here

The purpose of Focus 4 in the **PhOrM** instructional routine is to provide consolidation and a cross-mapping opportunity. Focus 4 can be used to review a particularly challenging word or to study a new word in depth (see, for example, Figure 4). It can also serve as a rich formative assessment task.

Conclusion

Learning Standard English spelling is complex, but it is facilitated and enhanced by explicit, targeted and systematic instruction. It involves learning to accurately and efficiently integrate phonological, orthographic and morphological components of words (**PhOrM**). High quality spelling error analysis, informed by **Triple Word Form Theory**, is an important element of spelling pedagogy. It includes measures that have robust psychometric properties to provide valid, reliable and objective insights into the underlying linguistic skills that students know, and need to learn, to improve their spelling. Assessment should focus on monitoring for acquisition, retention and transfer of taught skills (**ART**). The **PhOrM** components should feature in a weekly or fortnightly instructional routine throughout the primary school years (and beyond as needed). They can be taught as discrete components but also combined so that students can practice cross-mapping, especially when writing morphophonemically complex words. Instructional content should also be sequenced to allow for cumulative and spaced learning.

In addition, metalanguage needs to be developed with students to explain the linguistic properties of words and to demonstrate how words are formed. If teachers work with words to understand the components and use relevant metalanguage to explain and bring attention to spelling, the students will learn to use it too. Being able to explain how words are formed helps to develop explicit understandings of spelling.

To support building spelling skills, students should be given daily opportunities, wherever possible, to use taught words in a range of reading and writing contexts. This helps ensure learning is retained and has wide and consistent transfer. Attending to spelling as an **ART PhOrM** within assessment and instruction affords opportunities for students to learn new words and to effectively apply that knowledge in meaningful sentence-level contexts when communicating through writing.

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