

Sound-Letter Correspondences

Exploring phoneme-to-grapheme relationships



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Introduction



Introduction

There are **44 or so possible “sounds” in English** (give or take one or two). We call these sounds phonemes. For instance, the /p/ sound is the phoneme represented most often by the letter “p”. This correlation between sounds and letters forms the underlying basis behind the alphabetic principle.

Even this requires an even more fundamental set of skills; that is, it requires individuals to be able to break down their words into component sounds, which is what we call phonemic awareness. It is with phonemic awareness that I am able to divide a spoken word into syllables and divide a word like /cat/ into /k/+/short a/+/t/.

Once I am equipped with phonemic awareness and an ability to distinguish between sounds in my language (e.g. distinguish between the /b/ and /d/ sounds), I am in a stronger position to spell out words that I know.

Now, if we were learning to read and write in Finnish, all I would need to know is:

- my language;
- phonemic awareness;
- the sounds in Finnish;
- the sound-letter combinations in Finnish.

Each Finish sound is represented predominantly by only one possible grapheme, and each grapheme can only represent one sound. In Finish, I ...

- I hear a word;
- I break it up into syllables and sounds;
- I detect the right sound for each sound I hear; and
- I write the word based on my knowledge of sound-letter correspondence.

The spelling of a word is revealed directly through its pronunciation, and so it is considered to have a *transparent* orthography. In other words, its orthography (or spelling) is pretty clear to determine, or transparent.

In English, things are a little bit trickier: often an English sound can be represented by more than one grapheme, even though one grapheme may represent the sound in the majority of cases. It is phonologically possible to spell “fruit” as “froot”. One needs to distinguish between possible spellings and the conventional spelling.

Even though English can be considered opaque, this doesn't mean that it isn't logical. As with Finnish, it is important to be equipped with phonemic awareness and an ability to distinguish between sounds in my language. This helps me problem solve possible spellings of words that I know. However, with English, there is an additional step in which:

- I learn to invent spellings,
- I learn the conventional spellings of words,
- I learn to apply rules that help me determine why spelling *looks right*, and
- I learn to just know that certain spellings are corrects and others are wrong.

So please use this resource to navigate that “invented spelling” stage of learning about the alphabetic principle. This resource is a great companion to the *Analysing Spoken Words* activity.

Please explore and enjoy!

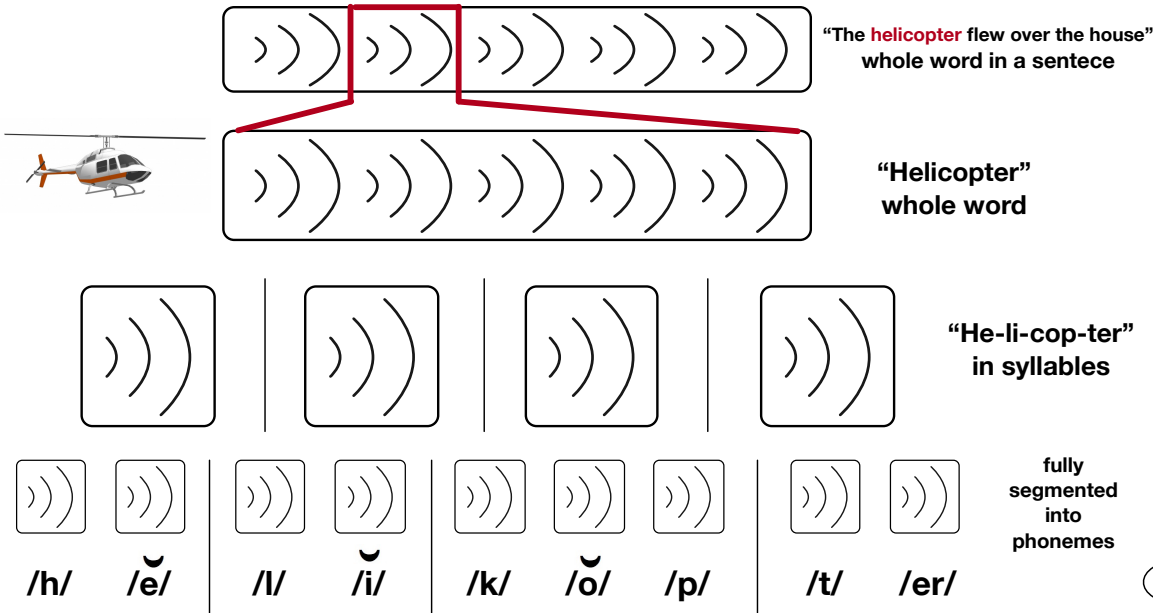


Sounds to Letters:

(a logical workflow)



Logical Workflow



In order to 'sound out' a word, one must possess strong **phonemic awareness** skills. Learners need to be able to divide words into syllables and syllables into individual sounds.

Over time, learners develop an understanding of the possible sounds in their language, also known as **phonemic knowledge**.

With plenty of practice, learners are able to gain a grasp of the **alphabetic principle** and of **spelling**, including the rules that help one proficiently write and pronounce words.

As learners recognise more and more words, it is easier to return greater attention to **meaning**, including both the meaning of individual **words** as well as **sentences** and **texts**.

EXTENSION

has rotating blades aircraft rescue vehicle

hovers used to watch traffic can land on buildings

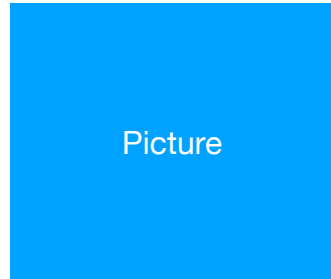
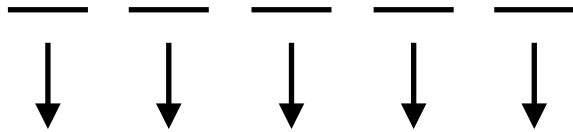
The helicopter flew over the house quickly.

what? did what? where? how?

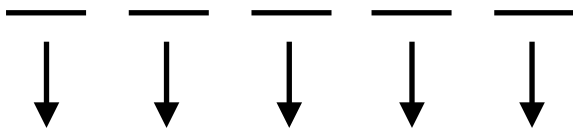


Example Activity Logic

Phoneme level



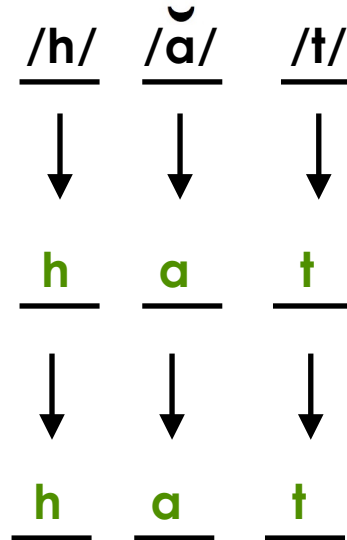
Invented spelling



NOTES:

(e.g. relating to any spelling rule or other feature)

Actual spelling

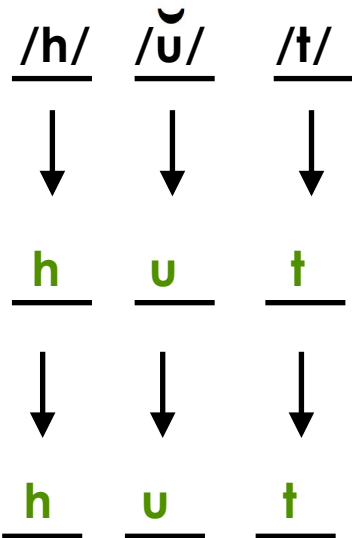


NOTES:

1. CVC words are a good way to encourage decoding, since CVC words have more predictable pronunciation patterns. CVC = consonant + vowel + consonant.

PLEASE NOTE:

1. Don't be fooled ... Whilst this activity can be "worksheet" oriented, it can easily be incorporated into all domains of meaningful word play.
 2. **Pre-requisite:** Strong phonemic awareness (PA) skills. The following mistake is possible if a learner is still developing strong PA skills:
 - Spelling "bd" for bed. The learner may not notice subtle vowel sounds.
 3. The activity logic is most effective when the teacher starts with simpler single-syllable words, and then progresses to two- and three-syllable words.
 4. The scope and sequence should be based on the sound system. Here's an example of a general beginning PA/phonics scope and sequence:
 - Teach a few consonant sounds with their main spellings (e.g., /m/ with "m," /t/ with "t," and /s/ with "s") and /ă/ spelling "a." Play PA games with these sounds, and have students spell and read words with these sounds and spellings.
 - Teach a few more consonant sounds with the /ă/ sound ... playing, spelling, and reading words as you go.
 - Add in another vowel sound (e.g., /i/) ... and so on ...
- (See *Further Resources* for a list of texts with effective phonics sequences.)



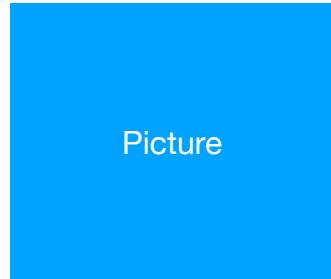
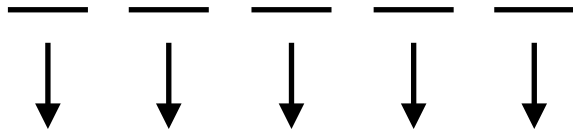
NOTES:

1. Comparing "hat" and "hut" allows the learner to focus attention on the difference between the short a vowel and the short u vowel. (**NB:** the vowel in CVC words is almost always the short form.)

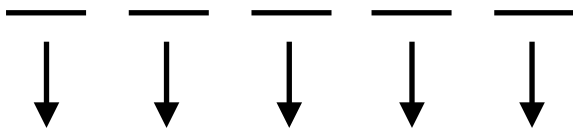


Example Activity Logic

Phoneme level



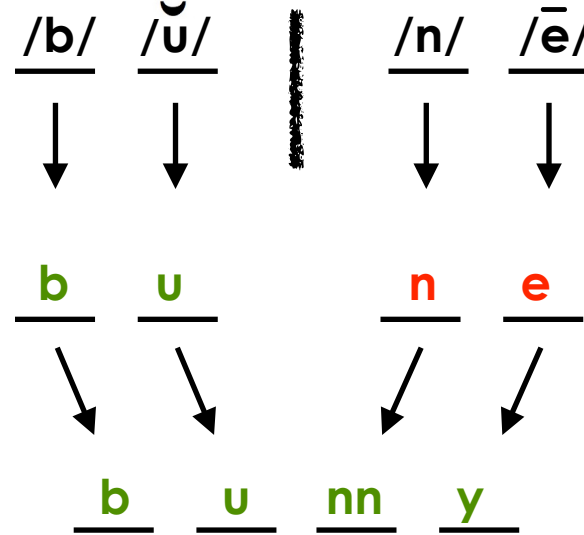
Invented spelling



NOTES:

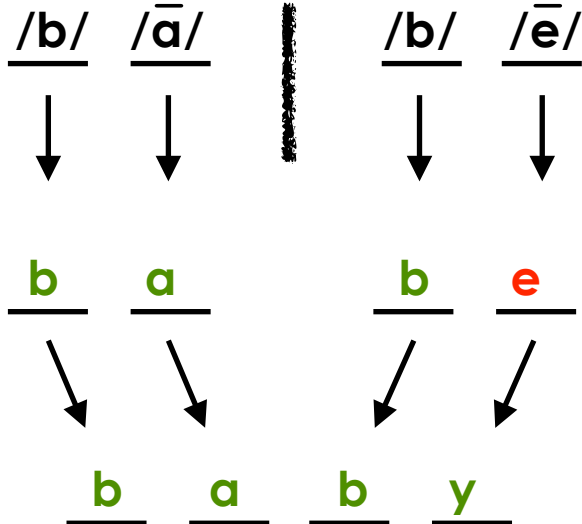
(e.g. relating to any spelling rule or other feature)

Actual spelling



NOTES:

1. Since a short vowel comes before the /n/ sound, the /n/ is represented by the double "nn".



NOTES:

1. No double "bb", since the "a" is the long vowel
2. Ends in "y" to make the / long e/. Otherwise the "e" would be silent.

PLEASE NOTE:

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Consonant Patterns

Phoneme	Most likely grapheme	%
/th/	“th” (nb: voiced & unvoiced forms)	100%
/hw/	“wh” as in while (must discriminate from /w/)	100%
/ks/	“x” (but “x” can also make the /z/ sound)	100%
/kw/	“q” (but “qu” make the /k/ sound rarely)	100%
/v/	“v” (except in “of” when the “f” makes the /v/ sound)	99.5%
/d/	“d” (must discriminate from /b/)	98%
/h/	“h” (but the letter appears in many phonics patterns)	98%
/b/	“b” (must discriminate from /d/ and /p/)	97%
/n/	“n” (must discriminate from /m/ and /ng/)	97%
/r/	“r” (common words make the /r/ with “wr” or “rh”)	97%
/t/	“t” (even though the “t” can make the “ch” sound)	97%
/p/	“p” (must discriminate from /d/ and /b/)	96%

Phoneme	Most likely grapheme	%
/m/	“m” (must discriminate from /n/ and /ng/)	94%
/w/	“w” (must discriminate from /hw/)	92%
/l/	“l” (but also spelled will “ll”)	91%
/g/	“g” (but also spelled will “gh” and “g” also make /j/ sound)	88%
/f/	“f” (but also spelled will “gh” and “ph”)	78%
/k/	“c” (but the “c” also makes the /s/ sound)	73%
/s/	“s” (but /s/ is made by “c” 17% of the time)	73%
/j/	“g” (even though the letter “j” is /j/ 100% of the time)	66%
/z/	“s” (even though the /z/ sound is associated with “z”)	64%
/ng/	“ng” (even though “n” is /ng/ in “think”)	59%
/y/	“i” (which is probably the biggest surprise on the list)	55%
/ch/	“ch” (even though “t” can also make the /ch/ sound)	55%
/sh/	“ti” (is most common, though “sh” is quickest association)	53%
/zh/	“si” (even though represented in other ways)	49%



Sound-Letter Probabilities: Vowel Sounds

Vowel Patterns

Phoneme	Most likely grapheme	%
/short a/	“a” (as in cat ... with regular CVC pattern predictability)	96%
/short e/	“e” (as in pen ... with regular CVC pattern predictability)	91%
/aw/	“a” (as in father ... with more diversity than short vowels)	89%
/short u/	“u” (as in dug ... with regular CVC pattern predictability)	86%
/short o/	“o” (as in dog ... with regular CVC pattern predictability)	79%
/long o/	“o” (long vowels could be spelled with more diversity)	73%
/long e/	“e” (long vowels could be spelled with more diversity)	70%
/long u/	“u” (long vowels could be spelled with more diversity)	69%
/short i/	“i” (the /short i/ can also be spelled with “y” as in “myth”)	66%
/oi/	“oi” as in “boil” with “oy” as in “boy” making another 32%	62%
/ow/	“ou” as in “loud” with “ow” as in “cow” making 29%	56%
/short oo/	“u” as in “put” as well as “oo” in look at 31%	54%

Phoneme	Most likely grapheme	%
/long a/	“a” (and a_e at 35% as in “cake”)	45%
/long oo/	“oo” as in boot, represented by u, o, ou, u_e, ew, ue	38%
/long i/	“i_e” as in fire and “i” as in find, also by ie, y, igh	37%
schwa	equally represented by the vowels a, e, i, o, u	—%
/er/	<i>not stated in research study</i>	—%
/ar/	<i>not stated in research study</i>	—%
/air/	<i>not stated in research study</i>	—%
/ear/	<i>not stated in research study</i>	—%
/yur/	<i>not stated in research study</i>	—%

The percentages provided are based on the number of times each sound-spelling appeared in the 17,000 most frequently used words (Hanna et al., 1966). These included multisyllabic words.



Hanna, P. R., R. E. Hodges, J. L. Hanna, and E. H. Rudolph. 1966. Phoneme-Grapheme Correspondences as Cues to Spelling Improvement. Washington, DC: U.S. Office of Education.



Consonant Sounds & Letters






Consonant Sounds & Letters (1 of 6)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 /b/ as in ball	 b 97% of the time	also bb and bh	bb - b is often doubled after the short vowel in a two-syllable word (e.g. bubble) bt - makes the /t/ sound mb - makes the /m/ sound
/ch/ as in chin	ch 55% of the time	also tch and t (as in future)	ch also makes /k/ (in chord), and /sh/ (in chef) tch - is only used after a single vowel that makes it short sound
/d/ as in dog	d 98% of the time	also dd and -ed (as in borrowed)	dd - d is often doubled after the short vowel in a two-syllable word (e.g. daddy) ed - can make both the /d/ sound and the /t/ sound
/f/ as in fat	f 78% of the time	also ff, ph, -lf, -gh (in laugh)	ff - f is often doubled after the short vowel in a two-syllable word (e.g. taffy)
/g/ as in game	g 88% of the time	also gg, gh-, gu- (as in guide)	gg - g is often doubled after the short vowel in a two-syllable word (e.g. giggle) g - makes /j/ when it appears before e, i or y. Otherwise, it says /g/.






Consonant Sounds & Letters (2 of 6)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 /h/ as in hat	  h 98% of the time	also wh (as in whole)	the letter h often appears in quite a number of other graphemes, such as "ph", "sh", "igh"
/j/ as in jar	g 66% of the time	also j and dge (as in judge)	Words don't end in "j" g says /j/ before e, i or y. Otherwise, it says /g/. dge is used after a single vowel with its short sound
/k/ as in kite	c 73% of the time	also k, ck, ch, -que	c says /s/ when in front of e, i or y. Otherwise, it says /k/. ck is used after a single vowel with its short sound k is silent in kn
/l/ as in last	l 91% of the time	also ll and -le (as in little)	-le makes the C+le syllable
/m/ as in mat	m 94% of the time	also mm, -mn, mb	mm - m is often doubled after the short vowel in a two-syllable word (e.g. mommy)





Consonant Sounds & Letters (3 of 6)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 /n/ as in neck	  n 97% of the time	also nn, kn, gn, pn, mn-	nn - n is often doubled after the short vowel in a two-syllable word (e.g. funny)
/ng/ as in sing	ng 59% of the time	also n (as in think)	the letter n makes the /ng/ sound in words like "think" or "kan/ga/roo"
/p/ as in pop	p 96% of the time*	also pp (as in happy)	pp - p is often doubled after the short vowel in a two-syllable word (e.g. happy) p is silent in ps- , pt-
/kw/ as in quick	qu 100% of the time		q always needs the "u", so "u" is not a vowel in "qu", in the rare occasion - qu says /k/ as in cheque.
/r/ as in run	r 97% of the time*	also rr, wr, rh (as in rhombus)	rr - r is often doubled after the short vowel in a two-syllable word (e.g. funny)






Consonant Sounds & Letters (4 of 6)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 /s/ as in sit	 S 73% of the time	also SS, C, -se, sc, -ce, ps-	ss - s is often doubled after a short vowel (e.g. fuss) s says /z/ as in criticise c says /s/ before e, i or y. Otherwise, it says /k/.
/sh/ as in shop	sh 26% of the time	also ti-, ch, s, sci-, si-, shi-, ss, ssi-, ci-, sch-, sc-	
/zh/ as in fusion	si 49% of the time	also s, ti-, z, -ge, g, j (as in deja vu)	
/t/ as in top	t 97% of the time	also tt, pt-, -bt, -ed (as in jumped)	tt - t is often doubled after the short vowel in a two-syllable word (e.g. fatty)
/th/ as in thing	th 100% of the time	th in 2 forms: voiced [that] and unvoiced [think]	





Consonant Sounds & Letters (5 of 6)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
	 		
/v/ as in van	v 99.5% of the time	also -ve and f (as in of)	Words do not end in v, but they do end in -ve
/w/ as in water	w 92% of the time	also wh (as in whale)	
/hw/ as in whole	wh 100% of the time		
/wə/ as in one	wo (as in won)	also o (as in one and once)	
/ks/ as in fox	x 100% of the time		in the rare occasion, the letter "x" makes the /z/ sound, as in xylophone



Consonant Sounds & Letters (6 of 6)






What do I hear?	What will I likely see/write?	What might I also see or write?	
 /ks/ + /sh/	 xi (as in anxious)	also X (as in luxury)	
/y/ as in yes	y at 45% of time	also i (as in onion)	the letter "y" can also serve as a vowel (see vowel rules)
/z/ as in zoo	S at 64% of time	also Z, ZZ, -ze, -se, X	zz - s is often doubled after a short vowel (e.g. buzz) the letter "s" makes the /z/ sound more often than the letter z



Vowel Sounds & Letters









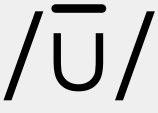



Vowel Sounds & Letters (1 of 5)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 /ă/ as in cat	 a 96% of the time	also au, ae, ai (as in plaid)	a - as in cat (CVC words) au - as in laugh ae - is rare (as in aesthetic) ai - is also rare
/ā/ as in baby	a 45% of the time	a_e, ai, aigh, ay, ea, ei, ey	a - as in baby a_e - as in fate ai - as in stain aigh - as in straight
 /ĕ/ as in pen	e 91% of the time	also ea, ie, ai (as in said)	e - as in pen (CVC words) ea - as in bread ie - as in friend ai - is rare
 /ē/ as in me	e 70% of the time	ee, ea, e_e, ei, ey, i, ie, i_e, y	"y" makes the long e sound at the end of multisyllabic words (e.g. happy, happily)
 /i/ as in pin	i 66% of the time*	also y (as in myth)	i - as in pin (CVC words)





Vowel Sounds & Letters (2 of 5)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 /ī/ as in pine	 i_e 37% of the time	i, ie, igh, ei, eigh, uy, y	Words do not end in "i", "y" makes the long i sound at the end of single syllable words (e.g. my, fly)
 /ō/ as in dog	 79% of the time	the <i>short o</i> sounds quite similar to the /aw/ sound as in father	
 /ō/ as in so	 73% of the time	o_e, oa, oe, ou, ew, ow, ough, eau	ew - sew ow - sow o - so oa - soak
 /ū/ as in fun	 86% of the time	also OU (as in touch)	English words do not end in "u"
 /ū/ as in tune	 69% of the time	also u_e, ue, ew, eau	English words do not end in "u" ue - blue ew - flew





Vowel Sounds & Letters (3 of 5)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 / oo / as in put	 u 54% of the time	oo (as in cook), oul and o	u - as in put oo - as in cook oul - as in would o - as in woman
/ oo / as in soon	oo 38% of the time	o , ue , ou , ough , u , u_e , ui , ew	oo - as in soon o - as in do ue - as in blue u - as in super
/ ow / as in cow	ou 56% of the time	ow and ough (as in drought)	ow - as in cow ou - as in out ough - as in drought
/ oi / as in coin	oi 62% of the time	also oy (as in boy)	oi - as in coin oy - as in boy
/ aw / as in father	a 89% of the time	aw , al , au , augh , o , ough	a - as in father aw - as in saw al - as in walk ough - as in fought





Vowel Sounds & Letters (4 of 5)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 /ar/ as in car	  ar 89% of the time	also ear (as in heart)	ar - as in car ear - as in heart
/er/ as in father	er (as in mister)	ear, ar, ir, or, ur, yr	ear - as in learn ar - as in dollar ir - as in girl or - as in work
/or/ as in for	or (as in doctor)	also our, oar and ore	or - as in for our - as in four oar - as in soar ore - as in more
/yur/ as in pure	ure (as in cure)	also our (as in your) and ur	ure - as in pure our - as in your ur - as in uranus
/air/ as in chair	air (as in stair)	are, eir, aer, ear, err	air - as in chair eir - as in their aer - as in aerial ear - as in pear



Vowel Sounds & Letters (5 of 5)

What do I hear?	What will I likely see/write?	What might I also see or write?	Notes
 /ear/ as in fear	 ear (as in clear)	also eer and ier	ear - as in fear eer - as in steer ier - as in tier
/ə/ as in about	a 24% of the time	also e, i, o, u (an /uh/ or /ih/ sound)	the schwa sound often appears in the unstressed syllable in a multisyllabic word a - as in alone e - as in jacket i - as in pencil o - as in gallop u - as in circus

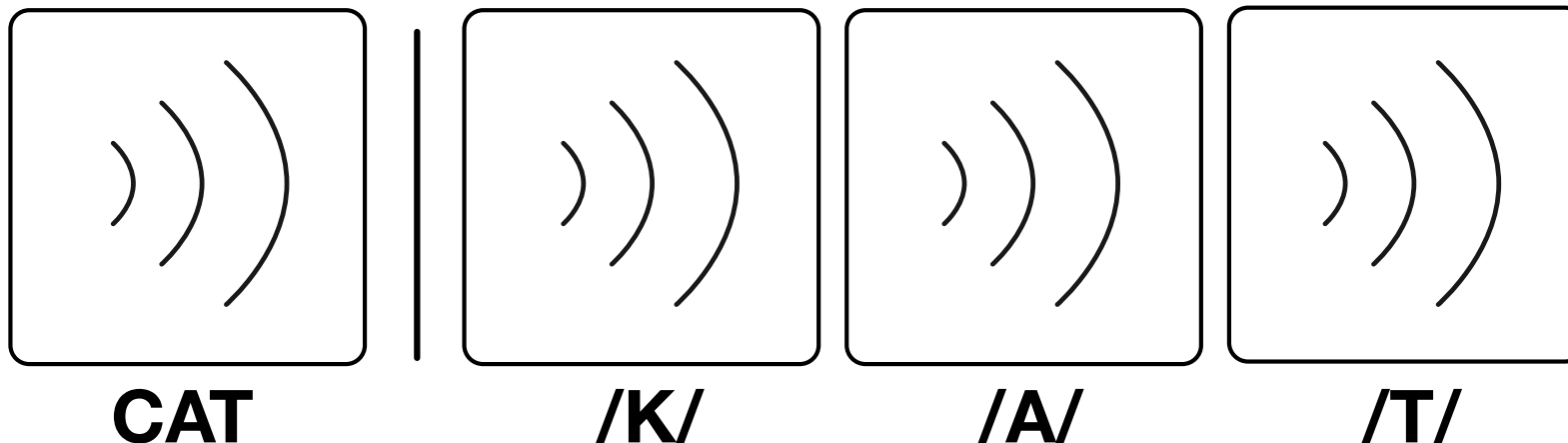


Further Resources

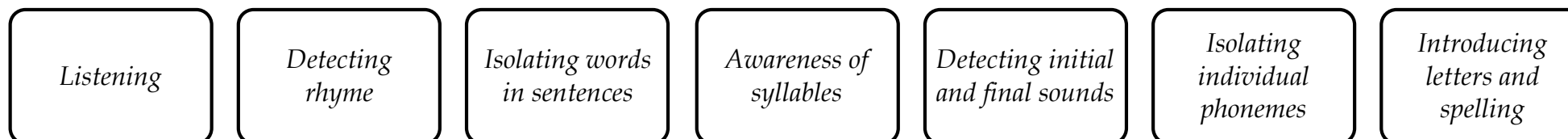


Elements of Phonemic Awareness

To be able to detect the sounds within words, and hold this in working memory long enough as to begin matching sounds to graphemes.



The Seven Steps to Phonemic Awareness Are



Please note: phonemic knowledge is the exact knowledge of the 45 possible phonemes (give or take one to two). In addition, the development of oral language skills, including vocabulary skills is an inherent precursor.

PA MILESTONES (Ages when 80-90 % of typical students achieved a phonological skill. <http://www.readingrockets.org/article/development-phonological-skills>)

Awareness of rhyme emerges = 24 - 30 mths
 Ability to produce rhyme emerges = 30 - 36 mths
 Rote imitation and enjoyment of rhyme and alliteration = 4 yrs old
 Rhyme recognition, odd word out = 5 yrs old
 Recognition of phonemic changes in words = 5 yrs old
 Clapping, counting syllables = 5 yrs old
 Ability to segment words into phonemes begins = 5 - 7 yrs old

Noticing & remembering separate phonemes in a series = 5.5 yrs old
 Blending onset and rime = 5.5 yrs old
 Producing a rhyme = 5.5 yrs old
 Matching initial sounds; isolating an initial sound = 5.5 yrs old
 Compound word deletion = 6 yrs old
 Syllable deletion = 6 yrs old
 Blending of two and three phonemes = 6 yrs old

Segment words w/ 2 -3 phonemes (no blends) = 6 yrs old
 Segment words w/ 3-4 phonemes (w/ blends) = 6.5 yrs old
 Substitute phoneme in words (no blends) = 6.5 yrs old
 Sound deletion (initial and final positions) = 7 yrs old
 Sound deletion (initial position, include blends) = 8 yrs old
 Sound deletion (medial & final blend positions) = 9 yrs old



Phoneme Map

<p>/b/</p> <p>(97% of time spelled w/ "b")</p> <p>bed bubbly Bhutan</p> <p><i>except</i> bt in doubt is /t/ mb in numb is /m/</p>	<p>/ch/</p> <p>(55% of time spelled w/ "ch")</p> <p>chair, catch, future</p> <p>-tch is used only after a single vowel that does not say its name</p> <p><i>except</i> ch in chef is /ʃ/ ch in chord is /k/</p>	<p>/d/</p> <p>(98% of time spelled w/ "d")</p> <p>dog daddy moved</p> <p><i>except</i> -ed in jumped is /t/</p>	<p>/f/</p> <p>(78% of time spelled w/ "f")</p> <p>food, stuff phone, calf laugh</p> <p>-gh is often silent in vowel constructs like eight, ough, ough, except for occasions like laugh or tough</p>	<p>/g/</p> <p>(88% of time spelled w/ "g")</p> <p>game giggle ghost guide</p> <p>G softens to /j/ when followed by E, I or Y. Otherwise, G says /g/</p>	<p>/h/</p> <p>(98% of time spelled w/ "h")</p> <p>hot whole</p> <p>the letter "h" is often silent in such a phonogram as "gh" or is part of another phonogram like "th" or when "wh" makes the /hw/ sound.</p>	<p>/j/</p> <p>(88% of time spelled w/ "g")</p> <p>jar giraffe cage fudge</p> <p>G softens to /j/ when followed by E, I or Y. Otherwise, G says /g/</p>	<p>/k/</p> <p>(73% of time spelled w/ "c")</p> <p>cake, kite, back, cat chord, cheque</p> <p>C softens to /s/ when followed by E, I or Y. Otherwise, C says /k/</p> <p>-ck is used only after a single vowel that says its short sound</p>	<p>/l/</p> <p>(91% of time spelled w/ "l")</p> <p>lion fall little</p> <p><i>except</i> lf in calf is /f/</p>	<p>/m/</p> <p>(94% of time spelled w/ "m")</p> <p>man summer autumn comb</p>
<p>/n/</p> <p>(97% of time spelled w/ "n")</p> <p>no funny knot gnat pneumonia mnemonic</p>	<p>/ng/</p> <p>(41% of time spelled w/ "n")</p> <p>sing singing</p> <p>think</p>	<p>/p/</p> <p>(96% of time spelled w/ "p")</p> <p>pie happy</p> <p>"p" appear as a silent letter in the relatively rare phonograms "ps", "pt" and "pn"</p>	<p>/kw/</p> <p>(100% of time spelled w/ "qu")</p> <p>quick</p> <p><i>except</i> -que in cheque is /k/</p>	<p>/r/</p> <p>(97% of time spelled w/ "r")</p> <p>run hurry rhyme write</p>	<p>/s/</p> <p>(73% of time spelled w/ "s")</p> <p>sun, messy house, science psychiatry, ceiling rice</p> <p>C softens to /s/ when followed by E, I or Y. Otherwise, C says /k/</p>	<p>/sh/</p> <p>(26% of time spelled w/ "sh")</p> <p>shoe, chef sugar, conscience, pension, fashion, pressure, mission, nation, physician, appreciate, initiate, schmitzel, fascism</p>	<p>/zh/</p> <p>(49% of time spelled w/ "si")</p> <p>confusion, casual, equation, seizure, , beige, regime, deja - vu</p>	<p>/t/</p> <p>(97% of time spelled w/ "t")</p> <p>tree little jumped pterodactyl doubt</p> <p><i>except</i> -ed in moved is /d/</p>	<p>/th/</p> <p>(100% of time spelled w/ "th")</p> <p>the this that thumb</p> <p><i>except</i> th in thyme is /t/</p>
<p>/v/</p> <p>(99.5% spelled w/ "v" or "ve")</p> <p>van have</p> <p>of - (irregular)</p>	<p>/w/</p> <p>(92% of time spelled w/ "w")</p> <p>water whale</p> <p>"w" is a silent in the word "write"</p>	<p>/hw/</p> <p>(100% of time spelled w/ "wh")</p> <p>while</p> <p><i>except</i> wh in while is /h/ wh in whale is /w/</p>	<p>/wə/</p> <p>one once wonderful</p> <p>In "one" the /w/ sound is not represented by a letter, making hits an irregular phoneme</p>	<p>/ks/</p> <p>(100% of time spelled w/ "x")</p> <p>fox</p> <p><i>except</i> -x in xylophone is /z/</p>	<p>/y/</p> <p>(42% of time spelled w/ "y")</p> <p>yellow onion</p> <p>"y" often serves a vowel and makes the short i, long i, long e and long a sounds.</p>	<p>/z/</p> <p>(23% of time spelled w/ "z")</p> <p>zoo fuzzy snooze is chocoe xylophone</p>	<p>ă</p> <p>(96% of time spelled w/ "a")</p> <p>cat laugh aesthetic (rare) plaid (rare)</p> <p><i>except</i> ai is normally /long a/ as in paid</p>	<p>ā</p> <p>(45% of time spelled w/ "a")</p> <p>paper, ape rain, straight day, steak, eight vein, they</p> <p>a vowel says its name (long form) at the end of a syllable as in paper.</p>	<p>ē</p> <p>(91% of time spelled w/ "e")</p> <p>bed bread friend said (irregular)</p>
<p>ē</p> <p>(70% of time spelled w/ "e")</p> <p>tree, she meat, eve, receive, key variation, petite chief, funny</p> <p>a vowel says its name (long form) at the end of a syllable as in she.</p>	<p>i</p> <p>(86% of time spelled w/ "i")</p> <p>sit myth</p>	<p>i</p> <p>(37% of time spelled w/ "i, e")</p> <p>bite, bicycle pie, high festive, height buy, my</p> <p>a vowel says its name (long form) at the end of a syllable as in she.</p>	<p>o</p> <p>dog</p> <p>the short o sound is quite similar to the /aw/ sound in law or father</p>	<p>ō</p> <p>(73% of time spelled w/ "o")</p> <p>veto, most bone, boat toe, soul grow, though, bureau</p> <p>a vowel says its name (long form) at the end of a syllable as in veto.</p>	<p>ū</p> <p>(86% of time spelled w/ "u")</p> <p>bug touch</p>	<p>ū</p> <p>(69% of time spelled w/ "u")</p> <p>pupil, tune, few, beauty</p> <p>a vowel says its name (long form) at the end of a syllable as in pupil.</p> <p>the /long u/ sound is quite similar to the /long oo / sound in soon or do</p>	<p>oo</p> <p>(31% of time spelled w/ "oo")</p> <p>cook put would woman</p>	<p>oo</p> <p>(38% of time spelled w/ "oo")</p> <p>soon, do blue, soup through, super flute, suit, new</p> <p>the /long oo/ sound is quite similar to the /long u/ sound in few or tune</p>	<p>/ow/</p> <p>(56% of time spelled w/ "ou")</p> <p>cow out drought</p>
<p>/oy/</p> <p>(62% of time spelled w/ "oi")</p> <p>boy soil</p>	<p>/aw/</p> <p>father law walk fraught on fought</p> <p>the /aw/ sound is quite similar to the /short o/ sound in dog</p>	<p>/er/</p> <p>(40% of time spelled w/ "er")</p> <p>father learn dollar girl work turn syrup</p>	<p>/or/</p> <p>for more soar four</p>	<p>/ar/</p> <p>(89% of time spelled w/ "ar")</p> <p>car, heart</p>	<p>/air/</p> <p>chair fare hair aerial tear error</p>	<p>/ear/</p> <p>fear peer tier</p>	<p>schwa -ə (ə, o, u)</p> <p>(24% of time spelled w/ "a")</p> <p>not really a single sound. It is more like an /uh/ or /eh/ breathy sound.</p> <p>alone gallop circus</p>	<p>schwa -ə (e)</p> <p>not really a single sound. It is more like an /uh/ or /eh/ breathy sound.</p> <p>jacket</p>	<p>schwa -ə (i)</p> <p>not really a single sound. It is more like an /uh/ or /eh/ breathy sound.</p> <p>pencil</p>



Phoneme-Letter Map

/b/	/ch/	/d/	/f/	/g/	/h/	/j/	/k/	/l/	/m/	/n/	/ng/	/p/	/kw/	/r/	/s/	/sh/	/t/	/th/	/v/	/w/	/hw/	/ks/	/y/	/z/	ā	ā	ē	ē	ī	ī	ō	ō	ū	ū	ū	oo	a	ow	oy	er	or	ar	air	ear	ure	a
b	ch	d	f	g	h	j	k	l	m	n	-ng	p	qu	r	s	sh	t	th	v	w	wh	x	y	z	a	a	e	e	i	i	o	o	u	u	u	oo	a	ow	oy	er	or	ar	air	ear	ure	a
bb	-tch	dd	ff	gg	wh-	g-	ck	ll	mm	nn	n	pp	rr	ss	ch	tt	-ve	wh	i	zz	au	a_e	ea	ee	y	i_e	o_e	ou	u_e	oo	o	aw	ou	oi	ear	ore	ear	are / ar	eer	your	e					
bh	t	-ed	ph-	gh-	-ge	c	-le	-mn	kn-	wr	sc-	sci	pt-	si	rh	-se	s	-ed	/zh/	f	/wa/	/ks/+ /sh/	-ze	ae	ai	ie	ea	ie	oa	ew	oul	ue	al	ough	ar	oar	air	ier	ur	i						
	-lf	gu-	-dge	ch	-mb	gn-	ps-	ss	-bt	s	c	ssi	ti-	ci-	-ge	si-	j	g	sc-	c-	t-	sh-	sch-	o	x	s	ai	aigh	ai	e_e	igh	oe	eau	o	ou	au	ir	our	ear	o						

Facts
 26 letters
 21 consonants
 5 (or 6) vowels
 45 phonemes
 73 basic phonograms
 23 other common phonograms
 6 common syllable types

Six Most Common Syllable Patterns

Closed	This syllable ends with a consonant and contains a single following, often in its short form	mat or pic-nic or fresh (e.g CVC or CCVC)
Open	This syllable type ends with a vowel and the vowel is often long	me or ve-to
Silent e or vowel consonant e (ice)	This syllable has a silent e at the end which often signals that the vowel will be long	cape or stripe or cue
Vowel team or vowel pair	This syllable type contains two vowels that make one sound.	pain or head or toy
R-controlled vowel	This syllable contains a vowel with the letter r, and the vowel is neither short nor long.	far or ferment or torment
Consonant + le	This syllable always appears at the end of words and the consonant always goes with the -le	apple or simple or fickle

NB: English has no consistent rule to predict which syllable is stressed in multi-syllabic words ... unlike Pitjantjatjara where the first syllable is always the stressed syllable.

Alphabet (uppercase & lowercase)

A	B	C	D	E	F	G	H	I	J	K	L	M	Ch	Sh
a	b	c	d	e	f	g	h	i	j	k	l	m	ch	sh
N	O	P	Qu	R	S	T	U	V	W	X	Y	Z	Th	Wh
n	o	p	qu	r	s	t	u	v	w	x	y	z	th	wh

Sample Prefixes	Sample Bases	Sample Suffixes
re- before	bene- before	-ing ending
con- before	anthro- before	-s ending
in- before	circ- before	-es ending
anti- before	cred- before	-ly ending
dis- before	viv- before	-tion ending
mono- before	seq- before	-cian ending
un- before	soph- before	-ness ending
inter- between	phon- before	-ive ending

NB: While prefixes and bases often reveal something about the meaning of a word, suffixes often reveal something about the word's grammatical form (e.g. "-ly" signifies adverb or verb tense)

Word recognition is key, involving
 - phonological;
 - orthographic;
 - morphological;
 - etymological knowledge ...
 along with one's memorised words (or lexical store)

Sumerians would ask pupils to organise words semantically & phonetically

7 Levels of Phonemic Awareness

- 1) Listening
- 2) Attending to rhyme
- 3) _____ to words & sentences
- 4) _____ to syllables in words
- 5) _____ to onsets & rime
- 6) _____ to individual phonemes
- 7) Introducing letters & spellings.

Stages of Spelling Development (Version #1)

- 1) Pre-speller - birth to 4
- 2) Spell it like it sounds - 4 - 7 years old
- 3) Spell it by pattern - 7 - 9 years old
- 4) Spell it by rule - 9 - 11 years old
- 5) Coordinating multiple strategies - 10 - 13 years old
- 6) Spell it from knowledge - 13 years and older

Skills of early language, alphabetic knowledge & reading

- 1) Child develops knowledge of letter names and sounds;
- 2) Child identifies of beginning consonants in common words;
- 3) Child develops an accurate concept of words in text;
- 4) Child develops full phoneme segmentation ability; and
- 5) Child develops full word recognition skills (including the ability to match sounds to letters).

Stages of Spelling Development (Ehri, 2005)

- Pre-alphabet phase (by visual/contextual cues) = 3 - 5 yrs old
 - Partial alphabetic phase (by visual & salient parts) = 4 - 6 yrs old
 - Decoding (alphabet) phase (by grapheme/phoneme) = 6 - 7 yrs old
 - Consolidated (orthographic) phase = 7 - 9 yrs old
 - Morphological (by meaningful units) = 9 yrs old+
- Stages of Spelling Development (Bear, et al, 2014)**
 Emergent (Print Concept) Spellers = 3 - 5 yrs old
 Letter Name-Alphabetic (Semi-Phonetic) Spelling = 4 - 7 yrs old
 Within-Word Pattern (Transitional) Spelling = 7 - 9 yrs old
 Syllables and Affixes (Independent) Spelling = 9 - 11 yrs old
 Derivational Relations (Advanced) Spelling = 11 - 14 yrs old

Example Spelling Rules

C softens to /s/ when followed by E, I or Y;
 G softens to /j/ when followed by E, I or Y;
 When a one-syllable word ends in a single vowel Y, it says the /long i/ sound;
 Y says the /long e/ sound **only** at the end of a multi-syllabic base words.
 Source: *Uncovering the Logic of English* by Denise Eide (2011)

NB: A learner is able to spell topical vocabulary even if these words lie outside decoding ability. (Why would this be the case?)

Oral language is the foundation of literacy. And literacy is a vehicle to extend language.

Chall's Stages

- End Stage 0:** understands 1000s words (heard); reads few, if any.
- End Stage 1:** understands up to 4000 words (heard); can read about 600.
- End Stage 2:** understands up to 9000 words (heard); can read about 3000

Sample Activities

Many activities help learners grasp a growing mastery of the code. That said, all code-based activities must be enacted within meaning-based practices, such as dialogic reading, interactive writing, dramatic play and thematic explorations.

Code-based activities can involve the use of soundsticks, clapping syllables, picture blending/segmenting, Elkonin squares/boxes, ABC books, phoneme walls, letter tiles word scrambles, word sorts, concept sorts, word walls, interactive writing, dictated writing, dictagloss procedures, the Language Experience Approach, cut-up sentences and more. What do each of the above strategies have in common? They all provide ample opportunities for learners to manipulate sounds, letters and spelling patterns.

Sequence of Phonics/Spelling Instruction

Emergent (Print Concept): focus is on phonemic awareness and on alphabet (letter name) knowledge
Letter Name Alphabetic: [shrt] a, m, t, s, [shrt] i, f, d, r, [shrt] o, g, l, h, [shrt] u, c, b, n, k, v, [shrt] e, w, j, p, y, x, qu, z, sh, ch, th, wh, ck, consonant blends (e.g. st, pl, bl, gl, sl)
Within Word Stage: a-e, ai, ay, ie, ee, ea, ie, e-e, i-e, igh, y, o-e, oa, ow, u-e, oo, ew, vowel+r, oi, oy, ou, au, ow, kn, wr, gn, shr, thr, squ, spl, tch, dge, ge, homophones
Syllables & Affixes Stage: adding inflectional endings, multisyllabic words, homographs & homophones

Examples Words - Sequence of Phonics

Emergent (Print Concept): sorting pictures of words into letter sound, rhyme categories
Letter Name Alphabetic: hat, bug, fresh, much, pass, class, sad, job, blob, grab, sick, trick, rang, swing.
Within Word Stage: next, road, knock, frozen, coal, whose, throw, roast, cause, pause, paws, taught, shawl.
Syllables & Affixes Stage: chief, whine, theme, athlete, pilgrim, mushroom, nervous, service, receive, reign.
Derivational Stage: uneasy, insincere, unfasten, manipulate

Morphology & Inflectional Endings
 Over time, learners identify meaningful patterns within words. These are referred to as **morphemes**, which are linguistic units like the plural suffix "s" or "es", prefixes like "re" or "pre", Latin roots such as "spec" meaning "see", and grammatical suffixes like "-ment". They also learn the rules that govern how to add suffixes to base words: "when do I drop the "e"?" or "when does the y turn to i?" or "when do I double the final consonant?"

Final Word

We must remember that the code is a means to an ends, and not an ends in and of itself. And whilst it is true that a skilled reader can use the features of a word (e.g. its Latin root or grammatical suffix) to decipher the meaning/use of that word, this occurs much later in the learner's development.

So the code is what we use to make ourselves understood in print as long as the reader recognises words and language and conversations and a/the world in what is seen. The code is the interface between what I want to say and what I write, and what I am to know and what I read. We must remember that a child's written skills may be up to three years behind their oral skills, as the child learns to coordinate the demands of the written code as a vehicle for spoken thoughts. (Chall 1996)

We line up letters, words, spaces and punctuation on a page, and, collectively, something is said and we hope - at times vainly - that we will be understood. "And the words slide into the slots ordained by syntax, and glitter as with atmospheric dust with those impurities which we call meaning." (Burgess, 1968, *Enderby Outside*). And with each scaffolded utterance, we learn something more about language, the world and how/why we say what we say (e.g. the natural history of our conversations). And, at times, we need a bit of help to see it, whether that is help to literally decode/decipher/recognise our words or help to extract their meaning.

Often, when I have had a picture well framed or have hung it in the right surroundings, I have caught myself feeling as proud as if I had painted the picture myself. (Wittgenstein, Culture & Value)

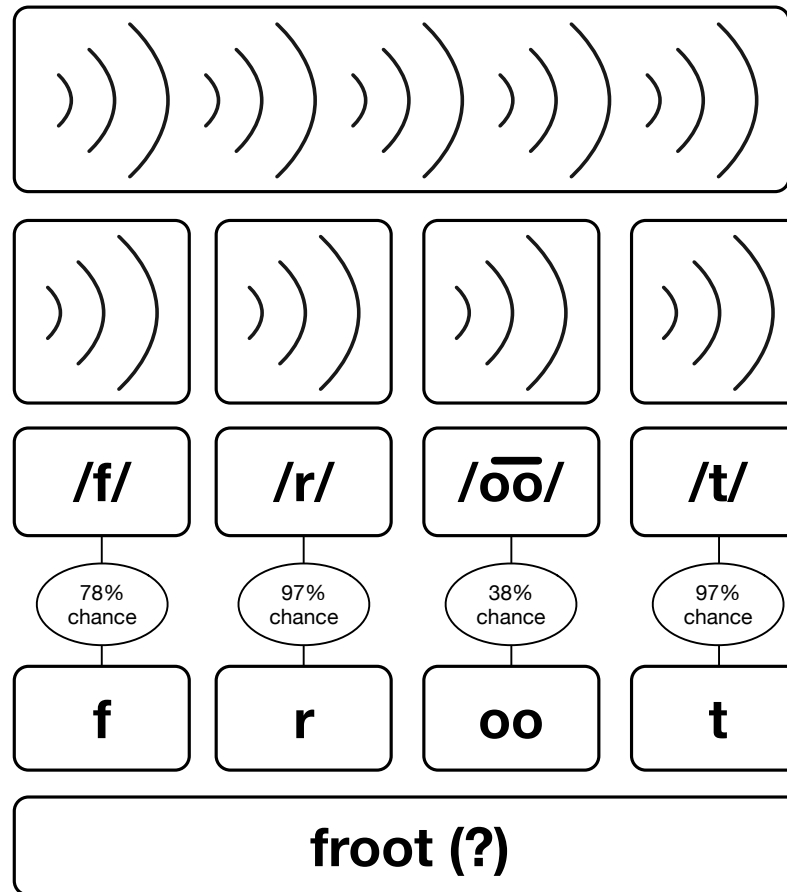
Words only make sense within the context of sentences (onward to grammar and grammatical facts)



Definition of Invented Spelling

"Before children attain a conventional level of spelling ... they use what they know about the phonology and orthography to create novel forms of spelling.

These **invented spellings** provide a window into their developing awareness of the alphabetic principle." (Ouellette & Sénéchal, 2017, p 77)



"The beginning reader's initial task is to learn how the spoken language they know relates to the written code they are learning." (Seidenberg, 2017, p 22)

**froot —> frute
—> fruit**

Ouellette, G., & Sénéchal, M. (2017). Invented spelling in kindergarten as a predictor of reading and spelling in Grade 1: A new pathway to literacy, or just the same road, less known? *Developmental Psychology*, 53(1), 77–88.



Appendix A SPELLING RULES

- Rule 1** C softens to /s/ when followed by E, I, or Y. Otherwise, C says /k/.
- Rule 2** G may soften to /j/ when followed by E, I, or Y. Otherwise, G says /g/.
- Rule 3** English words do not end in I, U, V, or J.
- Rule 4** A E O U usually say their names at the end of a syllable.
- Rule 5** I and Y may say /i/ or /i/ at the end of a syllable.
- Rule 6** When a one-syllable word ends in a single vowel Y, it says /i/.
- Rule 7** Y says long /ē/ **only** at the end of a multi-syllable base word.
- Rule 8** I and O may say /ī/ and /ō/ when followed by two consonants.
- Rule 9** AY usually spells the sound /ā/ at the end of a base word.
- Rule 10** When a word ends with the phonogram A, it says /ā/.
- Rule 11** Q always needs a U; therefore, U is not a vowel here.
- Rule 12** Silent Final E Rules
- 12.1** The vowel says its name because of the E.
- 12.2** English words do not end in V or U.
- 12.3** The C says /s/ and the G says /j/ because of the E.
- 12.4** Every syllable must have a written vowel.
- 12.5** Add an E to keep singular words that end in the letter S from looking plural.
- 12.6** Add an E to make the word look bigger.
- 12.7** TH says its voiced sound /TH/ because of the E.
- 12.8** Add an E to clarify meaning.
- 12.9** Unseen reason.
- Rule 13** Drop the silent final E when adding a vowel suffix only if it is allowed by other spelling rules.
- Rule 14** Double the last consonant when adding a vowel suffix to words ending in **one** vowel followed by **one** consonant, only if the syllable before the suffix is accented.*
- *This is always true for one-syllable words.
- Rule 15** Single vowel Y changes to I when adding any ending, unless the ending begins with I.
- Rule 16** Two I's cannot be next to one another in English words.
- Rule 17** TI, CI, and SI are used only at the beginning of any syllable after the first one.
- Rule 18** SH spells /sh/ at the beginning of a base word and at the end of the syllable. SH never spells /sh/

at the beginning of any syllable after the first one, except for the ending *-ship*.

- Rule 19** To make a verb past tense, add the ending ED unless it is an irregular verb.
- Rule 20** ED, past tense ending, forms another syllable when the base word ends in /d/ or /t/. Otherwise, ED says /d/ or /t/.
- Rule 21** To make a noun plural, add the ending -S unless the word hisses or changes, then add -ES. Occasional nouns have no change or an irregular spelling.
- Rule 22** To make a verb 3rd person singular, add the ending -S, unless the word hisses or changes, then add -ES. Only four verbs are irregular.
- Rule 23** Al- is a prefix written with one L when preceding another syllable.
- Rule 24** -Ful is a suffix written with one L when added to another syllable.
- Rule 25** DGE is used only after a single vowel which says its short (first) sound.
- Rule 26** CK is used only after a single vowel which says its short (first) sound.
- Rule 27** TCH is used only after a single vowel which does **not** say its name.
- Rule 28** AUGH, EIGH, IGH, OUGH. Phonograms ending in GH are used only at the end of a base word or before the letter T. The GH is either silent or pronounced /f/.
- Rule 29** Z, never S, spells /z/ at the beginning of a base word.
- Rule 30** We often double F, L, and S after a single vowel at the end of a base word. Occasionally other letters also are doubled.

Readers become orthographic experts by absorbing lots of data ... The path to orthographic expertise begins with practice practice practice but leads to more more more. (Seidenberg, 2017, p. 108)

Seidenberg, M. (2017). *Language at the speed of sight: how we read, why so many can't, and what can be done about it*. New York: Basic Books.

Source: , Eide, D. (2012). *Uncovering The Logic of English: A Common-Sense Approach to Reading, Spelling and Literacy*. Minneapolis: Pedia Learning Incorporated.



Alternative Sound-Spelling Chart (1 of 2)

Sound-Spelling Chart

This chart provides the most common spelling patterns for each sound.
(_ = a letter has to be in this place)

“SHORT” VOWEL SOUNDS

/ă/ - sat	/ĕ/ - hen	/ĭ/ - pig	/ŏ/ - hot	/ŭ/ - rug
a_	e_ ea_	i_	o_	u_
		y_		o (m, n, v)

“LONG” VOWEL SOUNDS

/ā/ - game	/ē/ - feet	/ī/ - bite	/ō/ - boat	/ū/ - two
a a_e	_y e	i_e i	o o_e	oo u o
ai_ ay eigh	ee ea ie	_y igh ie	oa ow oe	u_e ou ue

OTHER VOWEL SOUNDS

/ō/ - book	/yū/ - use	/aw/ - hawk	/ə/ - about (in multisyllabic words)
u oo_	u u_e ew	o a(l) (w)a au_ aw	o u a i e

DIPHTHONGS

/oi/ - toy	/ow/ - cow	/er/ - her	/ar/ - card	/or/ - for
oi_ oy	ou_ ow	er _or _ar ir ur	ar	or

VOWEL-R SOUNDS

CONSONANT SOUNDS

(■ = Short Vowel Sound)

/b/ - ball	/k/ - cat	/d/ - dog	/f/ - fan	/g/ - go
b ■bb	c(a, o, u) k(e, i, y) c k ■ck ch	d ■dd	f ph ■ff	g ■gg

/h/ - hat	/j/ - jump	/l/ - log	/m/ - man	/n/ - no
h	j g(e, i, y) _ge ■dge	l ■ll	m ■mm	n ■nn kn_

/p/ - pan	/kw/ - queen	/r/ - rat	/s/ - sit	/t/ - toe
p ■pp	qu	r rr wr_	s ■ss c(e, i, y)	t ■tt

/v/ - van	/w/ - win	/ks/ - fox /gz/ - exact	/y/ - you	/z/ - zoo
v _ve	w	_x	y i	s z ■zz

/wh/ - white	/sh/ - shoe	/ch/ - chin	/th/ - think	/th/ - that
wh_	sh _ti(on)	ch ■tch t(u)	th	th

/ng/ - ring	/zh/ - genre
_ng n(k, g)	_si(on) s(u) ge

Based on: Moats, L. C. (2009). *LETRS, Module 3: Spellography for teachers: How English spelling works*, 2nd Ed. Longmont, CO: Sopris West; McGuinness, D. (1997). *Why our children can't read and what we can do about it*. New York: The Free Press.

Based on: Moats, L. C. (2009). *LETRS, Module 3: Spellography for teachers: How English spelling works*, 2nd Ed. Longmont, CO: Sopris West; McGuinness, D. (1997). *Why our children can't read and what we can do about it*. New York: The Free Press.



Tips for Using the Alternative Sound-Spelling Chart

Here are a few ideas for using the sound-spelling chart:

- Use the above chart in conjunction with a systematic phonemic awareness (PA)/phonics scope and sequence.
- The scope and sequence should be based on the sound system. Here's an example of a general beginning PA/phonics scope and sequence:
 - Teach a few consonant sounds with their main spellings (e.g., /m/ with "m," /t/ with "t," and /s/ with "s") and /ă/ spelling "a." Play PA games with these sounds, and have students spell and read words with these sounds and spellings.
 - Teach a few more consonant sounds, playing, spelling, and reading words as you go.
 - Add in another vowel sound (e.g., /i/).
 - Continue on through the consonant sounds with their most common spellings and the short vowels.
 - Come back to the /k/ sound, but now show the spelling "ck." (This is a good one to show at this point because it only comes after short vowels.) Again, make sure students are spelling and reading words with this sound and spelling.
 - Teach and practice the sounds /sh/, /ch/, /th/, and /th/ with their spellings (i.e., "sh," "ch," and "th").
 - Move into long-vowel sounds, starting with the CVe pattern. This is a good place to start because you can take short-vowel, closed syllables ("can") and change them into VCe words ("cane") by adding the "e" at the end.
- Cycle through previously learned sounds and spelling patterns to build in lots of review and practice.
- As students master sounds and patterns in one-syllable words, have them practice spelling and reading sounds with specific patterns in two- and three-syllable words.

Based on: Moats, L. C. (2009). *LETRS, Module 3: Spellography for teachers: How English spelling works*, 2nd Ed. Longmont, CO: Sopris West; McGuinness, D. (1997). *Why our children can't read and what we can do about it*. New York: The Free Press.

