From Letters to Sounds and Back Again

Reading and Writing Long Words

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Overview

- Why is it important to do science-based reading and writing instruction?
- Why is spelling important?
- How do spelling and reading connect?
- What does spelling require that reading does not?
- How can we reinforce both skills?

We are going to explore reading because…

- It provides a case study how scientific principles affect our understanding of learning
- I don't know anything about math

Why is it important to do science-based reading and writing instruction?

Learning to read and write without scientific instruction affected my family

My sister struggled to learn to read

My sister, age 3

I tried to help but didn't know how

Her brother, age 7

Learning to read and write without scientific instruction affected my students

Sergio & Rosa   Jaime & Adolfo

Mr. Kearns
teaching 3rd grade

Wilson Elementary

Learning to read and write without scientific instruction affects many children
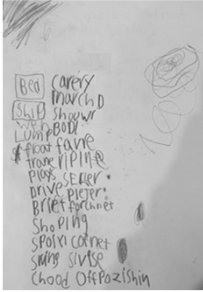
- Noah's spelling shows difficulty with…
  - advanced vowels
  - polysyllabic words
  - morphologically complex words
  - handwriting
  - attention

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Are handwriting and spelling important?

for practical reasons
- Writing quality is first judged on spelling and handwriting
- Children want to spell things correctly

for evidence-based reasons
- spelling skill predicts word recognition skill
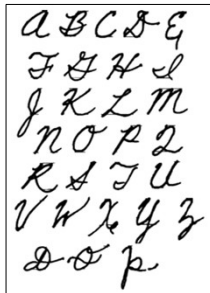- spelling skill predicts written composition quality

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Ahmed et al. (2022):

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Let's write some words…

- Remember to use the alphabet letters to the right.
- The bottom row is for
  - /ð/
  - /ə/
  - /ð/ (alternate spelling)

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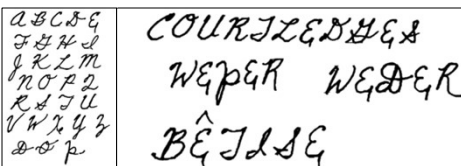
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Let's write some words… Answers

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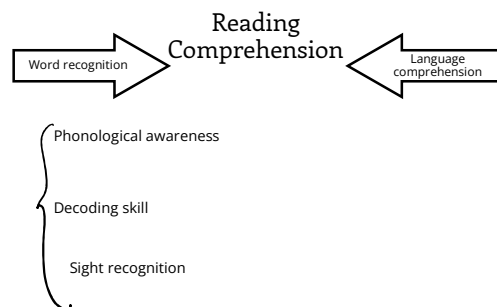
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Turn and Talk: How did the writing go?

- To what extent were you successful?
- What contributed to your success or difficulty?
- How did you feel?

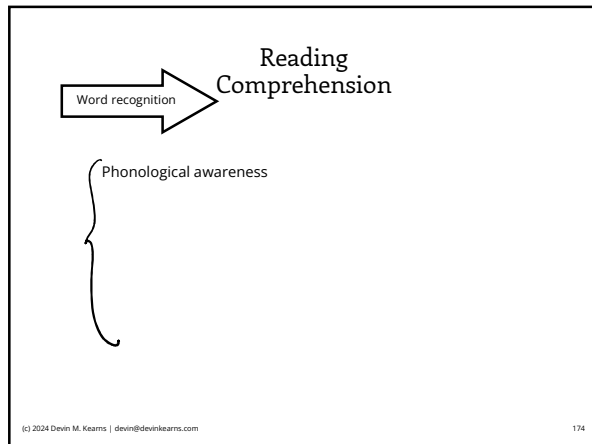(c) 2024 Devin M. Kearns | devin@devinkearns.com

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Reading Comprehension

Word recognition

Language comprehension

Phonological awareness

Decoding skill

Sight recognition

adapted from Scarborough (2001): Scarborough, H. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. Neuman & D. Dickinson (Eds.), *Handbook for research in early literacy* (pp. 97-110). New York, NY: Guilford Press

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Reading Comprehension

Word recognition

Phonological awareness

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Phonological awareness in Peter Rabbit

Once upon a time there were four little Rabbits, and their names were Flopsy, Mopsy, Cotton-tail, and Peter. They lived with their Mother in a sand-bank, underneath the root of a very big fir-tree.

the ability to detect and manipulate sound units in words

...allows us to blend syllables

cat   tan

ˈcaʔ ɨn

...allows us to blend phonemes

b   æ   n   k

bẽŋk

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Reading Comprehension

Word recognition

Phonological awareness

cat   tan

Decoding skill

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Decoding Skill

Once upon a time there were four little Rabbits, and their names were Flopsy, Mopsy, Cotton-tail, and Peter. They lived with their Mother in a sand-bank, underneath the root of a very big fir-tree.
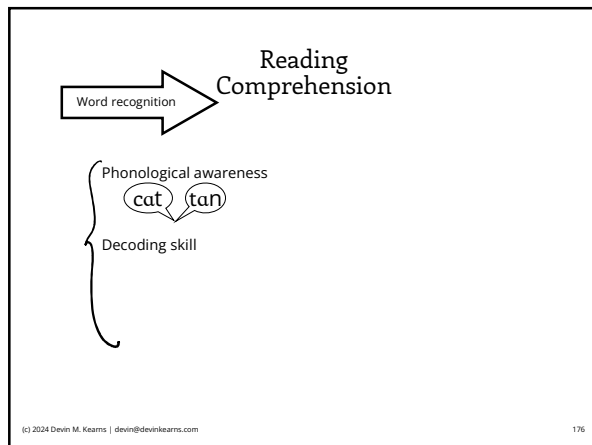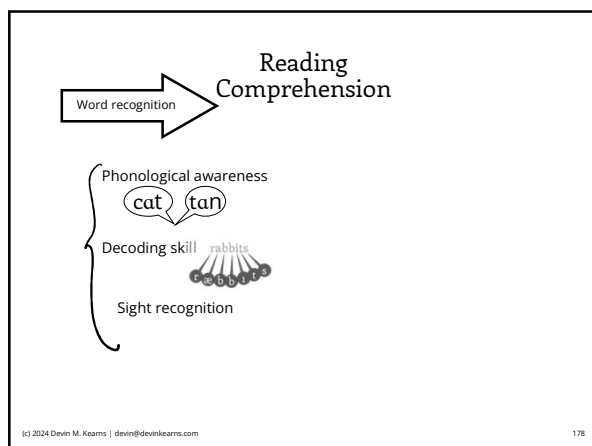
1. Identifying letter-sound connections

r   r

2. Combining letter-sounds to read unfamiliar words

abbits

ˈræb ɨts

æ   b   b   ɪ   t   s

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Reading Comprehension

Word recognition

Phonological awareness

cat   tan

Decoding skill   rabbits

Rabbits

Sight recognition

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Sight recognition

Once upon a time there were four little Rabbits, and their names were Flopsy, Mopsy, Cotton-tail, and Peter. They lived with their Mother in a **sand**-bank, underneath the **root** of a very big fir-tree.

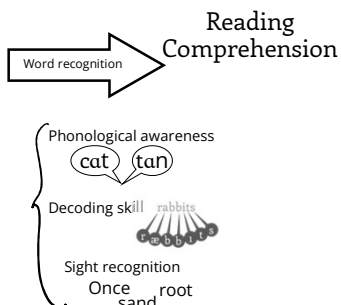immediate recognition of previously encountered words

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Sight recognition

Once upon a time there were four little Rabbits, and their names were Flopsy, Mopsy, Cotton-tail, and Peter. They lived with their Mother in a **sand**-bank, underneath the **root** of a very big fir-tree.

immediate recognition of previously encountered words

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Reading Comprehension

Word recognition

Phonological awareness
cat tan

Decoding skill rabbits

Sight recognition
Once root
sand

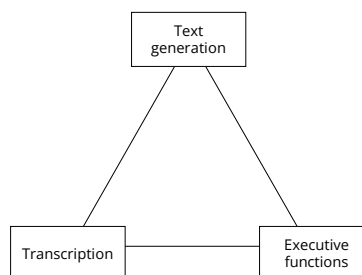(c) 2024 Devin M. Kearns | devin@devinkearns.com
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There are many models of written composition

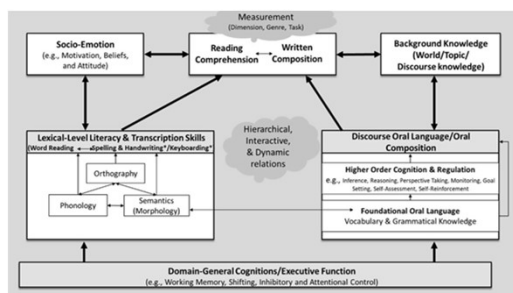(c) 2024 Devin M. Kearns | devin@devinkearns.com
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Not-so-simple view of writing

Text generation

Transcription — Executive functions

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Expanded Direct and Indirect Effects Model of Writing

Measurement
(Dimension, Genre, Task)

Socio-Emotion
(e.g., Motivation, Beliefs, and Attitude)

Reading Comprehension — Written Composition

Background Knowledge
(World/Topic/Discourse knowledge)

Lexical-Level Literacy & Transcription Skills
(Word Reading ← Spelling & Handwriting*/Keyboarding*)

Hierarchical, Interactive, & Dynamic relations

Discourse Oral Language/Oral Composition

Orthography

Higher Order Cognition & Regulation
e.g., Inference, Reasoning, Perspective Taking, Monitoring, Goal Setting, Self-Assessment, Self Reinforcement

Phonology — Semantics (Morphology)

Foundational Oral Language
Vocabulary & Grammatical Knowledge

Domain-General Cognitions/Executive Function
(e.g., Working Memory, Shifting, Inhibitory and Attentional Control)

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Written composition means using the elements of a simple(ish) view of writing

Transcription → Written composition ← Ideation

Hoover & Gough, 1990

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Written Composition

Transcription → ← Ideation

Spelling

fluent writing

Handwriting

Background knowledge

Vocabulary knowledge

Verbal reasoning

Skill in using syntax and language structure

Ability to use strategies

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Written Composition

Transcription →

Spelling

phonological awareness

decoding

sight recognition

Handwriting

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Slide

What kind of instruction will help?

Decoding using sound-spellings

Slide

Decoding using sound-spellings

Value of teaching decoding (phonics)

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Writing systems differ in the way the printed words represent spoken language (and have for a long time)

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There are various written units

pictogram

lip

wood

character shows literal meaning

ideogram

place

three

character shows abstract meaning

character represents spoken syllable

/sa/

syllabogram

/f/

glyph

flowering reed

Φ glyphs are *letters*

**individual
characters**

**that
represent
/saʊndz/**

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Φ Greek has 24 *letters*

Α Β Γ Δ Ε Ζ Η Θ Ι
Κ Λ Μ Ν Ξ Ο Π
Ρ Σ Τ Υ Φ Χ Ψ Ω

upper case

903

Φ Greek has 24 *letters*

α β γ δ ε ζ η θ ι
κ λ μ ν π ο ρ σ/ς
τ υ φ χ ψ ω

lower case

904

Цырыллиц Cyrillic has 30 to 33 *letters*

Аа Бб Вв Гг Дд Ее
Ёё Жж Зз Ии Йй Кк
Лл Мм Нн Оо Пп Рр
Сс Тт Уу Фф Хх Цц
Чч Шш Щщ Ъъ Ыы
Ьь Ээ Юю Яя

**and about an equal
number lower case**

905

English has 26 *letters*

A B C D E F G
H I J K L M N
O P Q R S T U
V W X Y Z

upper case

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English has 26 *letters*

a b c d e f g h
i j k l m n o p
q r s t u v w x
y z

lower case

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English is an alphabetic language that follows the **alphabetic principle**

alphabetic principle	Letters represent sounds.

The letter *m* *represents* the sound /m/.

Other languages also follow the **alphabetic principle**

other languages that use the Latin alphabet	dansk	italiano	español
	Deutsch	français	íslenska
	norsk	Nederlands	suomi

The letter *m* *represents* the sound /m/.

Languages without a Latin script also follow the **alphabetic principle**

letters that represent /m/ include

M M   in Ukrainian

م ـم ـمـ مـ   in Arabic

ม   in Thai

μ M   in Greek

In English, the **alphabetic principle** involves…

sounds **phonemes**	letters **graphemes**	grapheme-phoneme correspondences

/æ/   /k/
/**40** to **44**d/

a   c   d
b**26**

sound-spellings

a = /æ/
many   d = /d/
c = /k/

multi-letter graphemes

ch   ea   igh
many

ch = /tʃ/

many

b = /b/

many

c = /s/

Stop & Jot Many sound-spellings? Let's see…	

Think about a word that has the long *E* sound.

How is the long *E* sound spelled in that word?

Here's one: *E* as in *equal*

How many other ways is long *E* spelled?

many

many

many

Stop & Jot: How many ways can you spell the long *E* sound?	

Write all the spellings you know for the sound /i/.
(/ē/)
long *E*

Word	Spelling
equal	*E*

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Stop & Jot: How many ways can you spell the long *E* sound?

YES

about **8** graphemes

for **1** phoneme

Word	Spelling
equal	E

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Slide 916

What does this mean about

teaching phonics ?

The sound-spelling system is so complex...

is teaching about sound-spellings really worth it?

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Slide (What is phonics?)

What is phonics?

- A system
  - taught by teachers
  - practiced by students
  - In which
    - letters or letter combinations are linked to sounds or sound combinations
    - the sounds are assembled to pronounce a word
- Usually, phonics provides the student with a written representation for a known word
  - a student has already heard but has not seen in print

Slide 918

English has a complex orthography

It is a **deep** orthography writing system — where sound-spellings are quasiregular

rather than a **shallow** writing system — where the letters **really reliably** represent the sounds

Finnish is shallow.

aakkoset

918

Slide 919

It is true that the alphabetic principle is a little more consistent in other languages...

Researchers tested reading skills across languages ...

- with Grade 1 students
- in 13 European languages
- asking the question

svenska   suomi   Nederlands

ελληνικά   français

Deutsch   norsk   íslenska

dansk   italiano

English   Português

español

"By the end of Grade 1, how many words can students read?"

Seymour, Aro, & Erskine, & the A8 COST Action Network (2003)

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Slide 920

How many words?

Which language was the best overall?

Where does English rank?

What % of real and % nonsense English words could be read?

Language	% real	% nonsense

920

Quick aside: Why is English a deep writing system?

- The inhabitants of Britain didn't do so well in international conflict...

egg
scream

800s
900s
400s

Angles

live
black

Vikings
Norman
French
Saxons

1000s

courage
beef

English still does follow the **alphabetic principle**

- All English words have some letters that work...
- Even the worst ones...

What's a word with no reliable sound-spellings?

The Licensing Board for the City of Boston
7 DAYS   HEREBY GRANTS A   7 DAYS
Common Victualler License
TO SELL AND DISPENSE FOOD TO STRANGERS AND TRAVELLERS
TO EXPOSE, KEEP FOR SALE, AND TO SELL
ALL ALCOHOLIC BEVERAGES
TO BE CONSUMED ON THE PREMISES

boatswain
victuals
suite

The point is that...

"The complexity of English orthography cannot be an excuse for not teaching the principles and exemplary regularities in the system"

Perfetti (2003)

So English uses the alphabetic principle...
and it is valuable for teaching reading...
but we do have to lie to kids...

The Great Con
"treasure hunt"

C says /k/   *CK* says /k/

C also says /s/

CH says /ch/

CH also says /k/

There's also some stuff about *EA*....

What kind of instruction will help?

Learning strategies for reading polysyllabic words

Syllables

robot

ro = /roʊ/
bot = /bɑt/

Units that contain one vowel sound.

Bhattacharya & Ehri (2007)
Shippens et al. (2005)
Wise (1992)

Slide 1055

Syllables

robot

ro = /roʊ/
bot = /bɑt/

Units that contain one vowel sound.

b ɑ t

onset   peak   coda

Bhattacharya & Ehri (2007)
Shippens et al. (2005)
Wise (1992)

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Definition of a *polysyllabic word*

It contains more
than one syllable—usually marked by a vowel

po	ly	syl	lab	ic
pɑ	li	sɪ	læb	ɨk

/ ... / *vowel letter* / *vowel sound*

onset   peak   coda

A peak is usually a vowel sound.
A unit with a peak is a syllable.

Technically, syllables are sound units.

Clements & Keyser (1983)
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Slide (Wait... Polysyllabic?)

Wait ... *Poly*syllabic?

• Yes…
• *poly-* matches the Greek origin of *syllable-*
• We refer to polymorphemic words, so why multisyllabic?
• Some researchers have used this term (including me ☺)—it is particularly common in studies from France

Slide (Polysyllabic words become more common)

Polysyllabic words become more common in texts in the upper grades

Polysyllabic words encountered per year

Kearns et al., 2016; Renaissance Learning, 2012; Zeno, Iven, Millard, & Duvvuri, 1995

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Polysyllabic words occur in a lot of content area texts

aesthetic	photosynthesis
constitutional	polynomial

Hiebert, Goff, Thompson, & Franklin, 1999
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Students can use syllable information to improve reading

but…

syllables are TRICKY

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Blame the single-letter vowels in polysyllabic words

Single-letter vowels:
One letter that makes one sound

razor
meter
viper
motor
fusion
bygone

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Why blame the single-letter vowels?

| v**i**per | /aɪ/ |
l**i**nen	/ɪ/
glor**i**ous	/i/
flex**i**ble	/ə/
rabb**i**t	/i/
rais**i**n	/ /

i

How many pronunciations?

at least 4

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To dramatize the point...
This is true for every single-letter vowel

Letter	Long sound
A	razor
E	meter
I	vital
O	motor
U	music, tulip
Y	by, silly

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To dramatize the point...
This is true for every single-letter vowel

Letter	Long sound	Short sound
A	razor	wagon
E	meter	sedan
I	vital	vivid
O	motor	novel
U	music, tulip	buses, unusual
Y	by, silly	gym

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To dramatize the point...
This is true for every single-letter vowel

Letter	Long sound	Short sound	Well...
A	razor	wagon	water, Mary
E	meter	sedan	heron, hero
I	vital	vivid	spirit, virus
O	motor	novel	mother
U	music, tulip	buses, unusual	bury, busy
Y	by, silly	gym	yellow

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Syllable-based strategies

Syllable types

Syllable Types

Teach that printed syllables have predictable pronunciations

open syllables

closed syllables

other types of syllables

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Teach about open and closed syllables

Open syllable
- The vowel comes at the end of the syllable.
- The vowel says its "long" sound.

pĭlot
/pɑi/

1071

Teach about open and closed syllables

Open syllable
- The vowel comes at the end of the syllable.
- The vowel says its "long" sound.

pĭlot
/pɑi/

Closed syllable
- The vowel comes at the beginning or in the middle of the syllable.
- The vowel says its "short" sound.

pĭllow
/pɪl/

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Teach about open and closed syllables ... but limit metaknowledge

What is metaknowledge?
- Information related to the important knowledge
- In reading, this is information about words that teachers need but not students.

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Metaknowledge

Terminology
- Is it necessary for students to know these terms?
  - *open syllable*
  - *closed syllable*
- Is it adequate to rely on existing knowledge?
  - *long-vowel syllable*
  - *short-vowel syllable*

Strategies

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The syllable house

This is the house.

hen
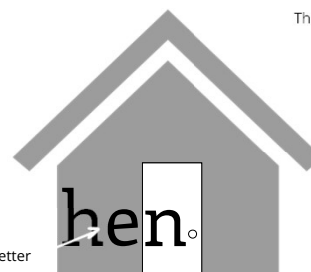
This is a vowel letter

This is the door.
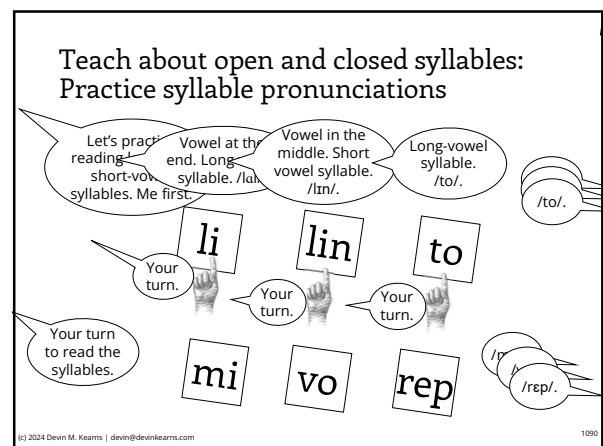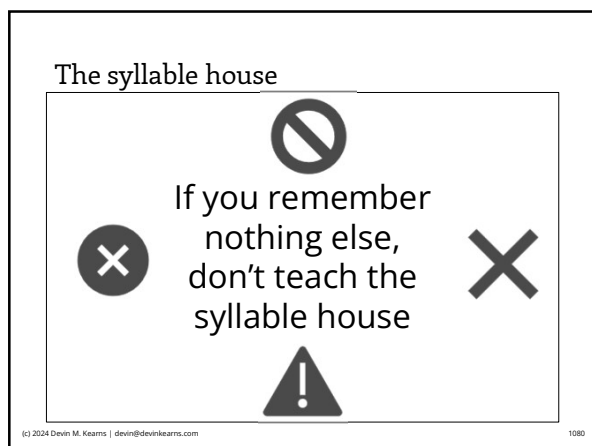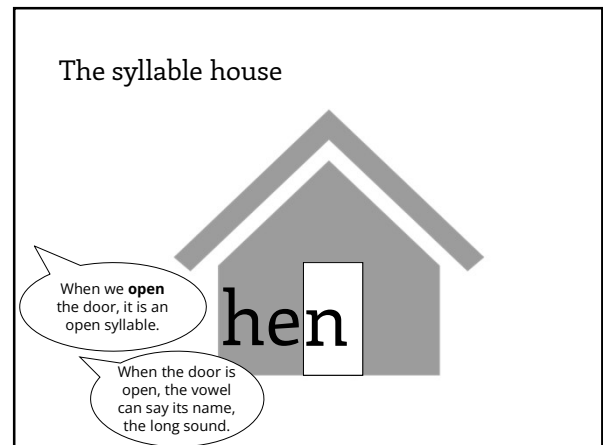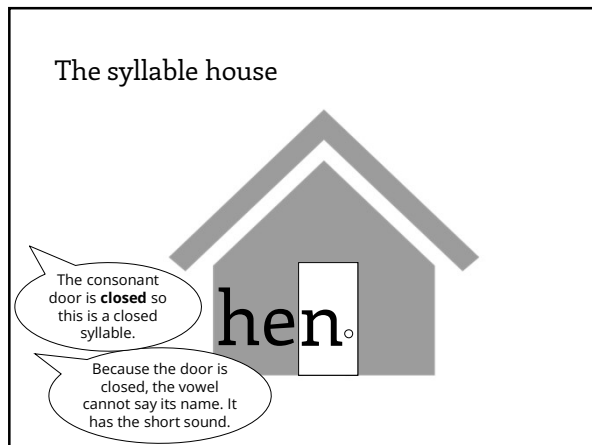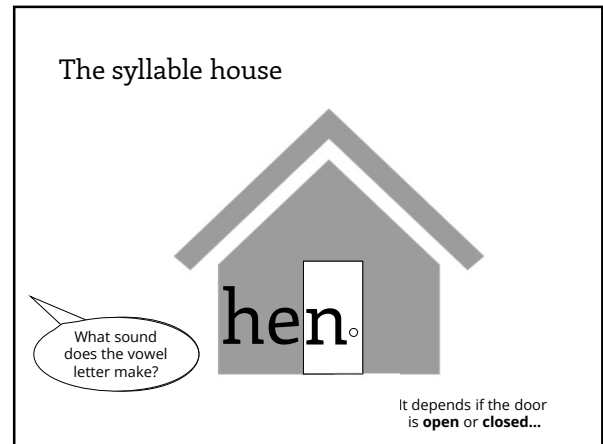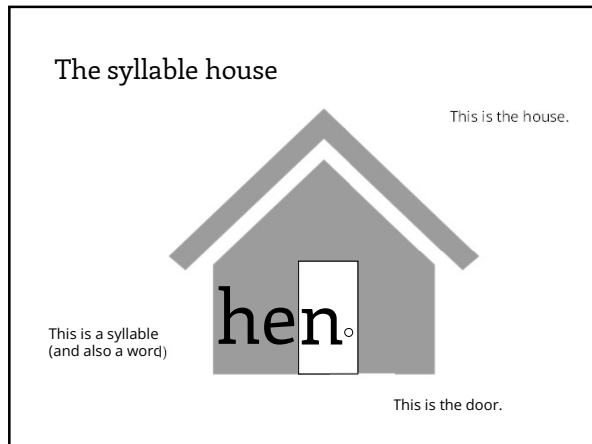
Teach about open and closed syllables: Practice vowel pronunciations

Let's practice reading pronunciations for these vowels. Let's say the short sounds first.

a e i
o u

Let's say the long sounds now.

a e i
o u

Let's practice the pronunciations of *Y.*

y

- Increase flexibility in encountering the single-letter vowels in polysyllabic words.

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Syllable-based strategies

Syllable division

Syllable division is a common approach in programs

Many based on the
Orton-Gillingham approach

but the data about the value are not strong

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How does syllable division work?

VC|CV V|CV

/ræb/ /tɑɪ/

rabbit tiger
VC|CV V|CV

Treiman, Bowey, & Bourassa, 2002; Treiman, Mullennix, Bijeljac-Babic, & Richmond-Welty, 1995; Treiman & Zukowski, 1990; Open Court Reading (McGraw-Hill, 2014); Wilson Reading System (Wilson, 2005)

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Data on VC|CV in bisyllabic words

Black = short sound (follows the pattern)
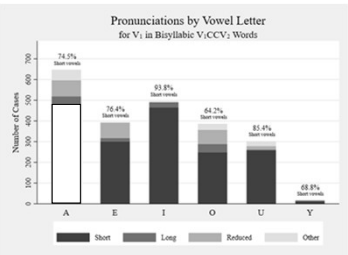
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Data on V|CV in bisyllabic words

Dark gray = long sound (follows the pattern)
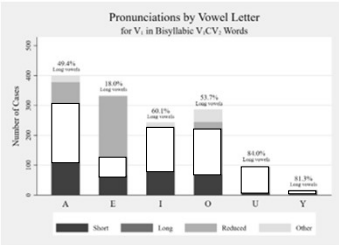
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What is the key message about syllable division?

- There are some cautions
- There is still a reason teachers like to teach it:
  - "Knowing basic phonics is not enough! An efficient, structured, logical, scientific, reliably automatic system for dividing and pronouncing longer words was an essential prerequisite for my academic literacy"
    - Quotation from an adult reader with dyslexia participating in Orton-Gillingham instruction (Cox & Hutcheson, 1988, p. 227).

Teaching Syllable Division to Facilitate Polysyllabic Word Reading: Current Research and Possible Alternatives

by Devin Kearns, Cheryl Lyon, Elizabeth Zagata, Melissa Stalega, and Shannon Kelley

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Slide 1100

Syllable division patterns commonly taught (not necessarily recommended)

VC|CV   rab|bit

V|CV   ti|ger

VC|V   drag|on

V|V   li|on

VC|CCV   in|stant

VCC|CCCV*

off|spring

just kidding... there are almost no words like this!

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Slide 1108
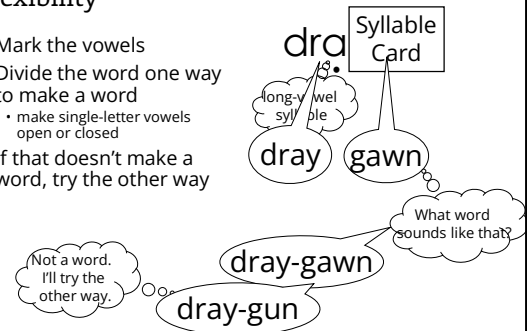
Practice reading by syllable with flexibility

Syllable Card

ri

This assumes knowledge of the long-vowel and short-vowel patterns.

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Slide 1109

Practice reading by syllable with flexibility

- Mark the vowels
- Divide the word one way to make a word
  - make single-letter vowels open or closed
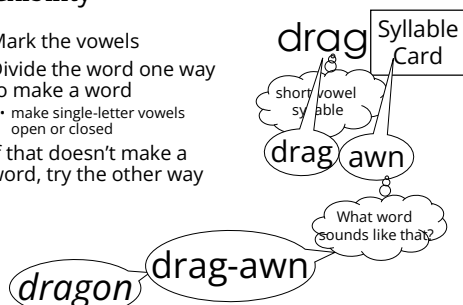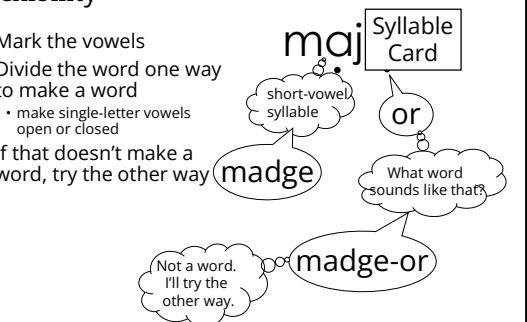- If that doesn't make a word, try the other way

dra — Syllable Card

long-vowel syllable

dray   gawn

dray-gawn

What word sounds like that?

Not a word. I'll try the other way.

dray-gun

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Slide 1110

Practice reading by syllable with flexibility

- Mark the vowels
- Divide the word one way to make a word
  - make single-letter vowels open or closed
- If that doesn't make a word, try the other way

drag — Syllable Card

short-vowel syllable

drag   awn

drag-awn

What word sounds like that?

dragon

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Slide 1111

Practice reading by syllable with flexibility

- Mark the vowels
- Divide the word one way to make a word
  - make single-letter vowels open or closed
- If that doesn't make a word, try the other way

maj — Syllable Card

short-vowel syllable

madge   or

madge-or

What word sounds like that?

Not a word. I'll try the other way.

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Practice reading by syllable with flexibility

- Mark the vowels
- Divide the word one way to make a word
  - make single-letter vowels open or closed
- If that doesn't make a word, try the other way

ma

Syllable Card

long-vowel syllable

jor

may

What word sounds like that?

may-jor

major

1112

Practice spelling words by syllable

- Say the word.
- Say the syllables.
- Write the syllables one at a time.
- Check and correct.

The word is *robot*. What word?

Robot.

Clap the syllables.

Row-bot

What's the first syllable?

Row.

Yes. Long-vowel syllable. Write it.

ro

1115

Practice spelling words by syllable

- Say the word.
- Say the syllables.
- Write the syllables one at a time.
- Check and correct.

What's the second syllable?

Bot.

Yes. short-vowel syllable. Write it.

ro bot

1116

Practice spelling words by syllable

- Say the word.
- Say the syllables.
- Write the syllables one at a time.
- Check and correct.

Robot is spelled *R-O-B-O-T*. If you need to correct it, circle it and write the correct word under it. Mark a smiley face.

ro bot

1117

Syllable Writing Worksheet

- Teach students how to use it
- Teach students how to correct mistakes
- Teach students to use it for multiple word types

1118

Syllable Writing Worksheet

- Teach students how to use it
- Teach students how to correct mistakes
- Teach students to use it for multiple word types

1119

Slide 1

Teach the peeling-off strategy

- Teach students individual affix pronunciations.

tion
less
re
ment

This prefix is pre. What is it?

pre

Pre.

P-R-E.

Spell it.

Let's add it to the peeling-off tree

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Slide 2

Teach the peeling-off strategy with common morphemes

Most Common Prefixes

Most Common Suffixes

Note: There are more common suffixes than prefixes.

pre
tion
re
less
ment

Find a list of common affixes.
Create a peeling-off tree as an anchor chart.
Explain and review meanings (when they have them).
Practice reading with flash cards.

Slide 3

Teach the peeling-off strategy

- Identify known affixes on the peeling-off tree
- Read the base word
- Chunk the word with the affixes attached

pseudo
hypo
ism
para

Syllable Card

pseudo | | | ism

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Slide 4

Teach the peeling-off strategy

- Identify known affixes on the peeling-off tree
- Read the base word
- Chunk the word with the affixes attached

tion
pre
less
re
ment

statement

st

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Slide 5

Teach the peeling-off strategy

- Identify known affixes on the peeling-off tree
- Read the base word
- Chunk the word with the affixes attached

tion
pre
less
re
ment

motionless

m

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Slide 6

Use the peeling-off strategy for spelling

- Say the word
- Say it by syllable
- Look for affixes on the peeling-off tree
- Spell it by syllable

tion
pre
less
re
ment

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Use the peeling-off strategy for spelling

The word is *prescription.* What word?

pre

tion

less

re

ment

prescription.

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1133

Create word chains for spelling polysyllabic words

• Give students affix tiles.
• Say a word.
• Have students say the word.
• Have students use the affixes plus tiles for the base word or root.
• Chain across words.

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The word is *descriptive.* What word?

Say the parts and spell the word.

If that's *descriptive,* show me *description.*

descriptive

de. scrip. tive.

de. scrip. tion.

| s | c | r | i | p |

| con | pre | re | de | tive / tion | ture |

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English spelling: Rule-driven

Spelling correctly depends on knowing many patterns	Spelling requires more patterns than reading
Good readers can be poor spellers.	

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1250

English orthography includes multiple pattern types

sound-spellings
• one sound can have multiple spellings
• One spelling can represent several sounds

position-based patterns
• surrounding phonemes control spelling

meaning
• morphological structure controls spelling
• language of origin controls spelling

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Position-based patterns
Double letters

One consonant sound (phoneme) is represented by a double letter

Jeff will pass Buzz.

What is the position-based pattern?

What precedes each double letter?

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Position-based patterns
Double letters

- buff
- bell
- hiss
- fuzz

- beef
- bail
- house
- freeze

1253

Position-based patterns
Double letters

F, L, S, and *Z* double when
following a short vowel phoneme

FLoSS + ZZ rule

1254

Position-based patterns
Other final phonemes

- batch
- back
- badge

- beach
- beak
- barge

1255

Position-based patterns
Consonant-LE

- LE at the end of a word says /ɨl/ or /əl/ or /l̩/
  (reduced/no vowel)
  - when preceded by b, ck, d, f, g, l, m, n, p, t, or z

Concept: One sound can have multiple
spellings

S

sit
snap
pass
missing

1257

Position-specific consistencies

S

SS

sometimes
taught
separately

sit
snap
pass
missing

1258

Position-specific consistencies

space
spacing
spacy

c
ce
cl
cy

sometimes taught this way

1259

Position-specific consistencies

spacing
spacy

space

c
ce
cl
cy

1260

Position-specific consistencies

spacy

space

spacing

c
ce
cl
cy

1261

Concept: One sound can have multiple spellings

space

spacing

spacy

c
ce
cl
cy

1262

Position-specific consistencies

s
ss
sometimes taught

c
ce
cl
cy

1263