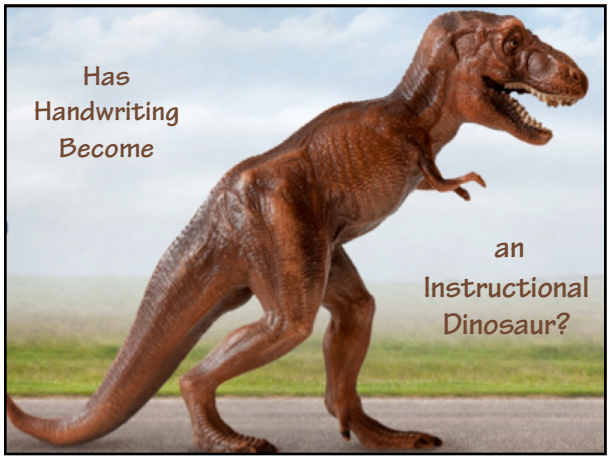
Has Handwriting Become an Instructional Dinosaur?
Handwriting May Be More Important Than You Think!
Best Practices for Teaching Handwriting
Nancy Cushen White, Ed.D.



1

Has Handwriting Become an Instructional Dinosaur?
Handwriting May Be More Important Than You Think!
Best Practices for Teaching Handwriting

The Tri-Counties Branch of
The International Dyslexia Association

April 29, 2025
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2



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3

Questions

1. What is dysgraphia?
2. What does the research tell us about the relevance of handwriting instruction?
   - Is handwriting skill linked with reading-spelling-written expression achievement?
   - Does handwriting have an impact on skills that affect overall literacy?
   - Are there advantages to teaching either manuscript (printing) or cursive letter formation?
   - Are there advantages to writing by hand (manuscript OR cursive) versus keyboarding?
   - Does the usefulness of writing by hand diminish as literacy increases?
3. Are handwriting difficulties due to fine motor problems alone or are they language based?
4. Is explicit handwriting instruction necessary? If so, why?
5. What are the benefits of integrating the teaching of handwriting with instruction in reading and written expression?

4

4

Triple Word Form Theory
Phonology—Orthography—Morphology
(Richards et al., 2006; Berninger et al., 2003)

- Learning to read and write words is a process of increasing awareness and coordination (integration) of three *different* types of word forms and their parts:
  - Phonological Awareness—speech sounds-phonemes
  - Orthographic Awareness—graphemes that spell those phonemes
  - Morpheme Awareness—morphemes-meaningful units composed of same phonemes-spelled with same graphemes
- Multidisciplinary evidence for triple word form theory continues to accumulate.

5

5

What Is Handwriting?
Berninger & Richards—2016

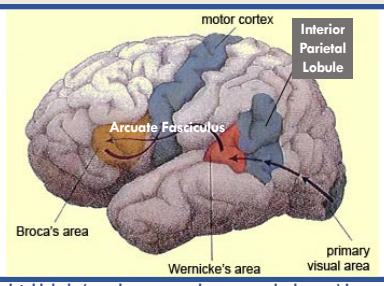
- Handwriting is partly a motor skill but not only a motor skill.
- Letter forms stored and processed in working memory* also play a role in handwriting.
- Orthographic Loop
  - Mind's Eye→where letters and graphemes (orthographic patterns) are stored and processed in working memory
  - Movement of hands and fingers

**phonological working memory*—*temporary memory that supports language learning and use of language*

6

6

Important Role of the Parietal Lobe



- The inferior parietal lobule (angular gyrus and supramarginal gyrus) is connected by large bundles of nerve fibers to both Broca's area and Wernicke's area.
- Information travels between these two areas either directly, via the arcuate fasciculus, OR by a second parallel route that passes through the inferior parietal lobule.
- Neurons in this lobule are multimodal; they can process different kinds of stimuli (*auditory, visual, sensorimotor,* etc.) simultaneously.
- The inferior parietal lobule can apprehend the multiple properties of spoken and written words: their sounds, their appearance, their function, etc.

7

What Is Dysgraphia?—Wolf & Berninger 2011

Just the Facts—"Understanding Dysgraphia"
https://dyslexiaida.org/understanding-dysgraphia/

- Dysgraphia is impaired handwriting—*a condition of impaired writing by hand*
  - Can interfere with written spelling
  - Can interfere with speed of writing
  - OR BOTH impaired handwriting and spelling
- Dysgraphia may occur alone or with dyslexia or with specific language impairment (oral language—speaking and/or listening) or with both dyslexia and specific language impairment.

8

8

What Is Dysgraphia?
Findings from Recent Research

- A relationship exists between dysgraphia (impaired handwriting) and orthographic coding in working memory.
  - What is orthographic coding?
    - Ability to store written words in working memory while the letters in the word are analyzed
    - Ability to create permanent memory of written words linked to their pronunciation and meaning
- Difficulty with planning sequential finger movements that affect handwriting

9

9

What Is Dysgraphia? Findings from Recent Research

- Although recent research has found that students with dysgraphia do not have a primary developmental motor disorder, they may have difficulty with planning sequential finger movements that affect handwriting.
- People with dysgraphia may have problems with only one or both of these:
  - Orthographic coding in working memory only → SPELLING
  - Planning sequential finger movements only → HANDWRITING
- BOTH impaired orthographic coding in working memory AND planning sequential finger movements

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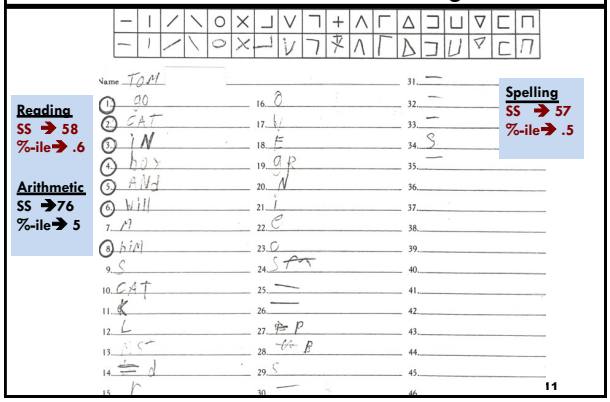
What's wrong if the sun is shining at midnight?
Grade Placement: 5.0 Age: 11-1



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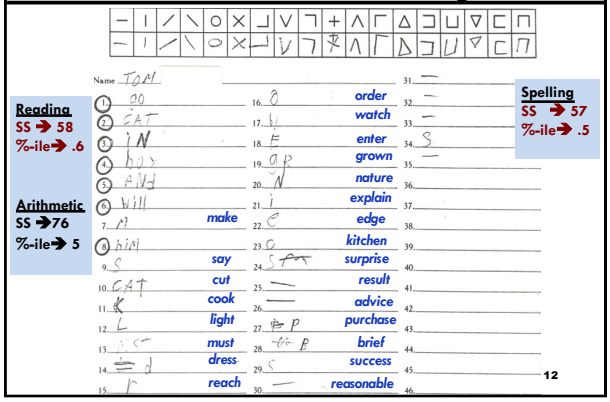
What's wrong if the sun is shining at midnight?
Grade Placement: 5.0 Age: 11-1



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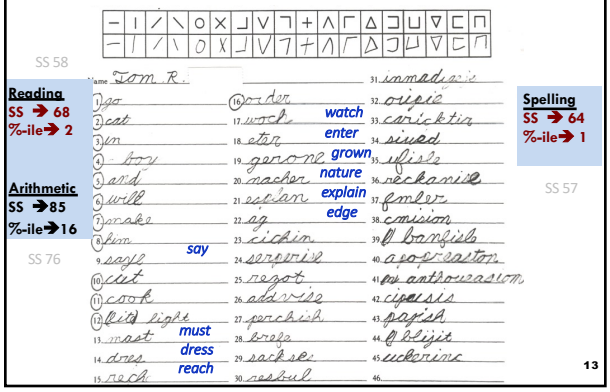
What's wrong if the sun is shining at midnight?
Grade Placement: 5.5 Age: 11-6



13

Cursive as a Foreign Language??
https://www.kqed.org/forum/20101018

- Harvard professor Drew Gilpin Faust recently discovered that the majority of students in her undergraduate history seminars could not read cursive.
- To them, it was like a foreign language.
- This is not surprising since cursive was not part of the Common Core educational standards introduced in 2010.

14

Handwriting Matters!

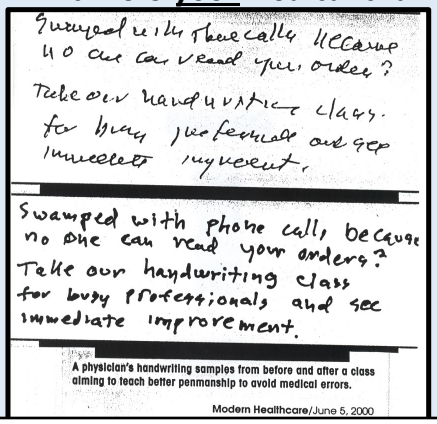
Kitty Burns Florey, 2009
Script and Scribble: The Rise and Fall of Handwriting

- Cacography*-caused business losses in North America cost around $200 million annually:
  - Calls to wrong numbers
  - Incorrect items shipped
  - Sloppy tax returns
  - Undeliverable letters and packages
- Even worse, illegible handwriting on medical orders or medical charts may result in misunderstandings that cost the lives of countless patients.

*cacography → writing AS cacophony → noise

15

What if this were your medical chart?????



A physician's handwriting samples from before and after a class aiming to teach better penmanship to avoid medical errors.

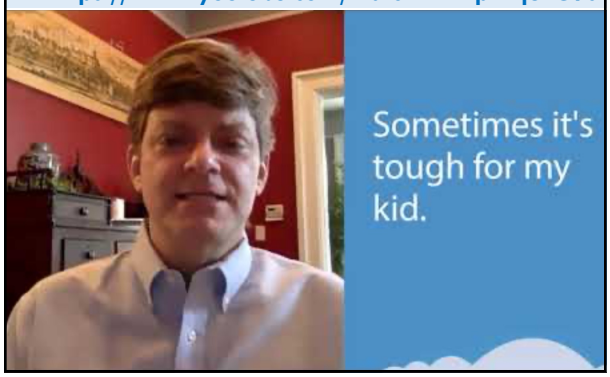
Modern Healthcare/June 5, 2000

16

16

William Van Cleave

https://www.youtube.com/watch?v=9pztTj8TCVs



17

Educational Summit
Handwriting in the 21st Century
January 23, 2012

- Conclusions and opinions from discussion of research regarding the role of handwriting instruction in the 21st century classroom:
  - Handwriting is a complex skill that involves both cognitive and fine motor skills.
  - Direct instruction is required.
  - The result of good instruction is that both cognitive development and development of motor skills benefit.

18

Letter Production and Letter Perception

James & Gauthier, 2006; Longcamp et al., 2003

- Research studies (behavioral, neuropsychological, and neuroimaging) have investigated how the brain responds to letters using a variety of letter tasks:
  - Letter perception
  - Letter writing
  - Letter copying
  - Letter imagery (visualization).
- Results show involvement of five distinct cortical regions—to different extents—for the various letter tasks:
  - These different brain regions form an integrated network:
    - Letter perception engages motor regions.
    - Writing recruits letter-specific visual regions.

19

Letter Production and Letter Perception

James & Gauthier, 2006; Longcamp et al., 2003

- Conclusions:
  - A close relationship exists between letter production (handwriting) and letter perception (visual recognition).
    - Both motor and visual regions are involved in handwriting.
    - Handwriting may enhance visual letter recognition.
    - This distributed network is a direct result of sensory-motor interactions with letters → handwriting.
- Degree of automaticity with which a child can write the alphabet by hand is the best unique predictor of the length of a child's composition—how many words they write within a time limit (Berninger).

20

Effects of Handwriting Experience on Literacy Learning

Study of Modality Effects on Literacy Learning: Typing-Visual-Writing

Wiley & Rapp, 2021

- With growing use of the Internet, cell phones, and laptops, there are many questions about how much time and resources should be spent on teaching handwriting.
- "To inform this debate, Wiley & Rapp (2021) conducted a training study with 42 adults that compared the benefits of learning new letters by typing, visual, or handwriting practice."

Questions

1. Are the benefits of handwriting practice due to motor learning per se or to other incidental factors?
2. Second, do the benefits generalize to untrained tasks?
3. Does handwriting practice lead to learning and strengthening only of motor representations or of other types of representations as well?

21

The Importance of Teaching Handwriting
Louise Spear-Swerling
www.readingrockets.org

Although word-processing programs and assistive technology are undeniably boons to children with writing problems, technological advances do not eliminate the need for explicit teaching of handwriting. Furthermore, very modest amounts of instructional time in the earliest grades — kindergarten and grade one — may help to prevent later writing difficulties for many children.

22

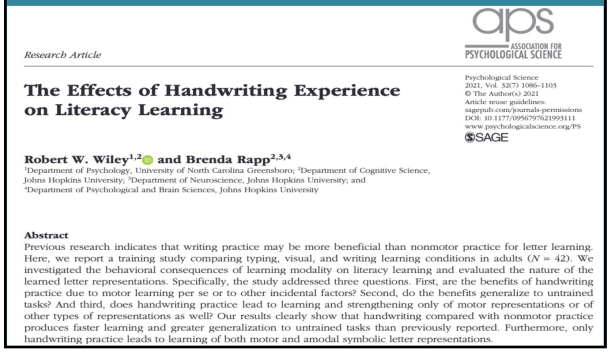
BIG IDEA
Handwriting is a productive use of learning time.
Wiley & Rapp, 2021

Results

- Handwriting practice—not typing or visual tasks—resulted in the best performance on a set of reading and spelling tasks that were not specifically trained.
- IMPLICATION: Subjects assigned to the handwriting practice group used their knowledge of how to write letters to strengthen performance across multiple reading and spelling tasks.
- Benefits of time spent practicing handwriting extend to letter recognition, word reading, spelling, categorization, and retention.

23

Study of Modality Effects on Literacy Learning: Typing-Visual-Writing
Wiley & Rapp, 2021



Research Article

aps ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

The Effects of Handwriting Experience on Literacy Learning

Psychological Science
2021, Vol. 32(7) 1086–1103
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DOI: 10.1177/0956797621993111
www.psychologicalscience.org/PS
SAGE

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[1]Department of Psychology, University of North Carolina Greensboro; [2]Department of Cognitive Science, Johns Hopkins University; [3]Department of Neuroscience, Johns Hopkins University; and [4]Department of Psychological and Brain Sciences, Johns Hopkins University

Abstract
Previous research indicates that writing practice may be more beneficial than nonmotor practice for letter learning. Here, we report a training study comparing typing, visual, and writing learning conditions in adults ($N = 42$). We investigated the behavioral consequences of learning modality on literacy learning and evaluated the nature of the learned letter representations. Specifically, the study addressed three questions. First, are the benefits of handwriting practice due to motor learning per se or to other incidental factors? Second, do the benefits generalize to untrained tasks? And third, does handwriting practice lead to learning and strengthening only of motor representations or of other types of representations as well? Our results clearly show that handwriting compared with nonmotor practice produces faster learning and greater generalization to untrained tasks than previously reported. Furthermore, only handwriting practice leads to learning of both motor and amodal symbolic letter representations.

24

Research-Supported Arguments for Handwriting Instruction

- Reading, writing, and spelling tasks use letters in ways that involve numerous cognitive processes.
- …it has been well established that better letter knowledge among young children (pre-K and kindergarten) is predictive of reading and writing skills even into the middle-school years (Bara & Bonneton-Botté, 2018; Berninger et al., 2006; Treiman & Kessler, 2004; Treiman et al., 1998; Zemlock et al., 2018).

25

Research-Supported Arguments for Handwriting Instruction

- Cognitive and Motor Skills Development
  - Effective handwriting instruction → benefits both cognitive development and development of motor skills (Hanover Research, 2012).
- Literacy Development
  - Handwriting → foundational skill that influences reading, writing, language use, and critical thinking (Saperstein, 2012):
    - Retrieval of letters from memory
    - Spelling
    - Extracting meaning from text or lecture
    - Interpreting context of words and phrases.

26

Research-Supported Arguments for Handwriting Instruction

- Brain Development
  - Sequential hand movements used in handwriting *activate regions of the brain associated with thinking, short-term memory, and language* (Slape, 2010).
  - Cursive *linked with brain functions related to self-regulation and mental organization* (Berninger, 2010).
- Memory
  - Comparison of classmates who took notes by computer and by hand: *Handwriters exhibited better comprehension of the content and were more attentive and involved during class discussions* (Peverly, 2012).

27

Research-Supported Arguments for Handwriting Instruction

- Written Expression
  - Elementary-age students who wrote compositions by hand rather than by keyboarding *wrote faster, longer pieces, and expressed more ideas* (Pressler, 2008).
  - Learning the mechanics of writing at the same time they are learning to express their thoughts on paper links the mechanical and creative processes in a child's mind (Florey, 2009).

28

Executive Functioning Demands Juggling the Act of Writing

- Writing places greater demands on internal working memory than reading does.
- Writing externalizes cognition, *making thought visible via written language,* to become an object for reflection and repair (Berninger & Winn, 2006; Fayol, 1999).
- As a result, writers gain conscious access—via writing to what they are thinking in unconscious implicit memory (Hayes & Flowers, 1980).

29

Manuscript, Cursive, or Keyboard?

- No research evidence clearly supports either manuscript or cursive letter formation as being better than the other.
- Both manuscript printing and cursive writing have advantages.

30

30

Additional Research Findings

University of Washington (Berninger et al.)

- Results of longitudinal research at the University of Washington showed that individual differences predicted who did best with manuscript, cursive, and keyboarding.
- First graders with low handwriting skill improved whether taught cursive or printing.
- Children write more, write faster, and express more ideas when composing by hand than when keyboarding in grades 2 to 6.

31

Manuscript

- Children encounter more written materials in manuscript fonts than cursive fonts, whether they are reading hardcopy books and written texts or viewing written language on their computer monitors or e-book readers.
- Printing manuscript letters transfers to the kinds of letters seen in books and on monitors.
- Despite small variations in letter forms sharing the same name, these advantages include learning to recognize and write letters.
- Brain imaging studies have shown that, during early childhood, writing letters improves letter recognition.

32

Cursive

- Increases speed of handwriting
- Reduces occurrence of reversals in writing
- Provides more consistency in where to begin formation of each letter
- Continuous strokes encourage linking of letters into lexical units—which supports accurate spelling.
- Linked with brain functions related to self-regulation and mental organization: "Cursive helps you connect things" (Berninger).
- *However, cursive letter formation is only functional after it has become automatic, and automaticity comes only with sufficient practice.*

33

33

Joan Sedita

Is Handwriting Actually Important for Writing?
https://youtu.be/xNgGsmafxQo?si=CMlMbaJJ1YiAD4xB



34

Keyboarding

These individual Keyboarding abilities are affected by individual differences occurring during early and middle childhood and adolescence (Berninger):

- Ability to touch type without looking at the keys
- Need to look at the keys when typing
- Use of just one hand to find and press the keys.

- These individual differences may be related to myelination in the frontal lobes that affects self-regulation of behavior.
- Hand size may be a factor.

35

35

Keyboarding

- Finger sequencing may play different roles in performing the series of strokes needed to type using one hand, using two hands, OR using all fingers to operate a keyboard.
- Using a keyboard also requires cross-case abstraction:
  - All letters on a standard keyboard are in capital case, but writers have to produce words, sentences, and text composed mostly of lower-case letters except for initial letter position or proper nouns.

36

36

Comparative Research: Writing by Hand and Keyboarding

- An advantage for writing by hand was observed when students were composing text.
- When the task was to write a single sentence, no differences were found in accuracy or time between handwriting and keyboarding.

CONCLUSION:

- *Advantage for writing by hand may be related to sustained writing when composing a first draft.*

37

37

Steve Graham

https://www.youtube.com/watch?v=TkqsHH0oQXw



38

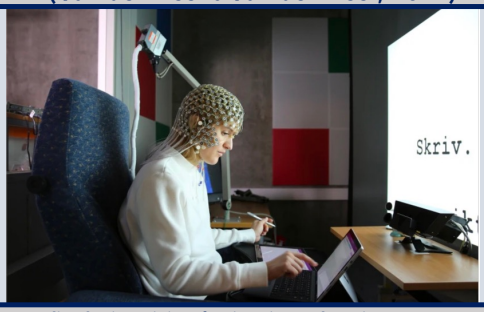
Comparative Research: Writing by Hand and Keyboarding

- When asked to write alphabet letters in order, *keyboarding had an advantage over handwriting*—perhaps because it takes less time to find and press keys than to form letters stroke by stroke.
- However, brain research in France (Longcamp et al., 2003) and the United States (James & Gautier, 2006) shows that forming letters stroke by stroke, rather than selecting and pressing keys, enhances perception, learning, and memory.
- OUR BRAINS PROGRAM THEMSELVES BY CONSTRUCTING AND ACTING ON THE WORLD—NOT JUST BY PASSIVELY RECEIVING INFORMATION.

39

Writing by Hand May Increase Brain Connectivity More than Typing…

(Van der Weel &Van der Meer, 2024)



After recording brain activity of university students in Norway, researchers determined that writing by hand may improve learning and memory (2024).

40

"Writing by hand may increase brain connectivity more than typing, readings of student brains suggest
After recording the brain activity of university students, researchers in Norway determined that writing by hand may improve learning and memory."
Aria Bendix

- *"Our main finding was that handwriting activates almost the whole brain as compared to typewriting, which hardly activates the brain as such.*
- *The brain is not challenged very much when it's pressing keys on a keyboard as opposed to when it's forming those letters by hand," said Audrey van der Meer, the study's co-author and a neuropsychology professor at NTNU.*
- *In particular, the study found that writing by hand required communication between the brain's visual, sensory and motor cortices.*
- *People who wrote with the digital pen had to visualize letters, then use their fine motor skills to control their movement when writing.*
- *"When you have to form letters by hand, each letter requires a completely different movement pattern," van der Meer said.*

41

41

Hybrid Writers
Multilingual by Hand

- **The advantage of handwriting over keyboarding during middle childhood evened out during early adolescence.**
- **Manuscript (printing), cursive, and keyboarding *should all be taught to all children* so they can become *multilingual by hand* in the information age (Berninger).**
- **In the Information Age, more attention should be given to developing hybrid writers skilled in multiple modes of letter production for a variety of writing purposes.**

42

42

The Importance of Teaching Handwriting
Louise Spear-Swerling
www.readingrockets.org

- Although word-processing programs and assistive technology are undeniably boons to children with writing problems, technological advances do not eliminate the need for explicit teaching of handwriting.
- Furthermore, very modest amounts of instructional time in the earliest grades — kindergarten and grade one — may help to prevent later writing difficulties for many children.

43

Focus initially on learning the motor pattern rather than perfect legibility or size.
Louise Spear-Swerling
www.readingrockets.org

- When children are learning to form a new letter, it is helpful to begin with large movements such as forming the letter in the air.
- Have children use a sweeping movement with the entire arm, not just the hand.
- This initial practice should emphasize learning the motor pattern with correct formation of the letter rather than writing the letter on paper with perfect legibility or size.

44

Teach children consistent formation of letters using a continuous stroke if possible.
Louise Spear-Swerling
www.readingrockets.org

- Children should learn a highly consistent way to form a given letter every time they write it.
- Although some letters, such as <*f* > and <*t*>, require lifting the pencil from the paper to make a second stroke, teach letter formation using a continuous stroke (without lifting the pencil from the paper) when possible.

45

In teaching cursive, explicitly teach connections between letters as well as formation of single letters.
Louise Spear-Swerling
www.readingrockets.org

- Unlike manuscript writing, cursive writing involves making connections between letters within a word.
- Once children can form individual letters, explicit teaching of letter connections is important.
- Connections involving four letters — cursive *b*, *o*, *v*, and *w* — followed by a subsequent letter (e.g., as in the words *bed*, *on*, *have*, *will*) are often especially confusing for children, because unlike most cursive connections, these do not involve going back down to the bottom line before writing the subsequent letter.

46

Need for Automaticity
Automatic Functional Use

Handwriting (Manuscript AND Cursive) AND Keyboarding

- Owing to limited cognitive resources, processes have to compete with each other whenever overall demand exceeds supply.
- According to capacity theory, the gradual automatization of lower-level processes (i.e., handwriting), frees up resources that can then be used to engage more controlled higher-level (e.g., spelling, formulation) processes in parallel and/or to conduct more complex and demanding processing (Just and Carpenter, 1992; McCutchen, 1996, 2011).

47

47

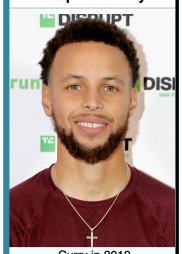
Practice! Practice! Yes!
Who needs to practice?

In preparation for one of the NBA championship games, Steph Curry arrived 75 minutes early. In 20 minutes, he made 190 warm up shots, getting better each time (*The New York Times*, June 13, 2022).

Steph Curry knows that high level play depends on total mastery of basic skills. He also knows that they are the skills that must be practiced. Drill does not kill his game.

To become the champion he is today, Steph Curry has had an abundance of talent, excellent instruction, and opportunities for practice.

Stephen Curry



Curry in 2019

48

Unspectacular Preparation

Roger Staubach—Former Dallas Cowboys Football Player

- "Spectacular achievements are always preceded by unspectacular preparation"

Dan Willingham—2004

- "... if we want children to understand and appreciate excellence, we would do well to send the message that excellence requires sustained practice. The athletes and artists revered by many students excel not solely by virtue of their talent, but because of their hard work."

Descriptive studies (Roe, 1953) of eminent scientists indicate that the most important factor predicting their success is not innate talent or intelligence, but the willingness to work hard for extended periods of time."

49

Goal of Handwriting Instruction? Automatic Functional Use

Handwriting (Manuscript AND Cursive) AND Keyboarding

- As children learn to form legible letters, the goal of handwriting instruction is automatic formation of letters—with minimal attention and effort—so mental resources can be devoted to generating thoughts, translating those thoughts into written spelling, sentence structure, and organizing text.
  - SPEED WILL DEVELOP AS MOVEMENTS FOR WRITING BY HAND (LETTER FORMATION) AND KEYBOARDING (TYPING) BECOME AUTOMATIC.
- The goal is to provide an automatic, legible tool that enhances all aspects of language.

50

50

Advice from a very wise teacher…

Beth H. Slingerland

Speed is not the road to success.

Careful practice is the road to speed.

51

51

Keyboarding Needs to Be Taught

- Availability of computers has not eliminated the need for accurate, effortless handwriting and spelling.
- Automatic recognition of print, or of letters on the keyboard, requires working memory for letter forms.
- Writing in general helps build important neural connections in the brain, helping to better remember whatever is to be written—but typing does not build these connections.

52

52

Is Writing Primarily a Motor Task?
-Writing Is a Written Language Process-

Virginia Berninger—University of WA-Seattle

Non-motor mental processes involved in handwriting:

- Working Memory—*for storing and processing letter forms in the "mind's eye" (inner "eye" for viewing and analyzing letters and written words as we read and write)*
- Naming Letters—*auditory-kinesthetic integration helps "find" letter form and its label within long-term memory*
- Planning to Form Letters—*before the motor system writes them*
- Incoming Visual and Touch Sensory Information—*as letters are viewed while hands and fingers move to form letters on paper*
- Orthographic Loop of Working Memory—*integrates letters and written words in "mind's eye" with sequential hand and finger movements during writing*

53

53

-Handwriting Is a Written Language Process-
Handwriting Automaticity

Virginia Berninger—University of WA-Seattle-

- Once children have been introduced to letter formation, they *must learn to retrieve and produce letters automatically.*
- Handwriting automaticity is a strong predictor of the quality of composition in normally developing and disabled writers.
- If letter production is automatic, memory space is freed up for higher level composing processes, such as deciding what to write about, what to say, and how to say it.
- The intactness of fine motor skills alone DOES NOT ACCOUNT FOR HANDWRITING PROBLEMS AS MUCH AS THE ABILITY TO CODE AN IDENTIFIED LANGUAGE SYMBOL (A LETTER) IN MEMORY.

54

54

Teaching Handwriting to Students with Dyslexia and Dysgraphia: Some History

Dr. Samuel Torrey Orton
Reading, Writing and Speech Problems in Children (1937)

"From our studies, extending over the past 10 years, we have so far been able to recognize only one factor which is common to the entire group and that is *difficulty in repicturing or rebuilding in the order of presentation,* sequences of letters, of sounds, or of units of movement."

visual➔auditory➔kinesthetic-motor (speech and writing)

55

55

Principles of Instruction Based on Orton's Research For Teaching Handwriting

➢ **Emphasis on building associations**—linkages between and among **visual➔auditory➔kinesthetic modalities**—sensory pathways:

- **Simultaneous** multisensory (multimodal) teaching and learning: **linking visual, auditory, and kinesthetic-motor (BOTH writing and speech)**
- Association of the letters that the eyes are seeing and the ears are hearing with the feel of sound production (speech) and letter production (writing)—***INSTEAD OF RELYING ON VISUAL MEMORY.***

56

56

What Does It Take to Learn to Write???

- The process of learning to write depends initially upon learning to recognize the graphic forms of every letter.
- Writing encompasses simultaneous production of multiple processes:
  - Spatial organization
  - Margins
  - Sequence of movements for forming each letter
  - Punctuation
  - Capitalization
  - Spelling
  - Vocabulary
  - Syntax-Grammar
- Writing demands sufficient working memory to enable the student to remember and to think at the same time.

57

57

Ray, K., Dally, K., Colyvas, K., & Lane, A.E. (2021). The Effects of a Whole-Class Kindergarten Handwriting Intervention on Early Reading Skills. *Reading Research Quarterly*, *56*(S1), S193-S207. https://doi.org/10.1002/rrq.395

According to the 4*R*s model (Ray et al., 2021), handwriting fluency requires the following:

1. Recall: Students recall the mental representation of a letter.
2. Retrieval: Students remember the sequence of movements required to form the letter.
3. Reproduction: Students use fine-motor and visuomotor skills to write the letter.
4. Repetition: Students repeatedly practice letter writing in order to develop fluency.

58

Goal➔ Automaticity➔"Kinetic Melody" (Luria)

- Luria: *Writing occurs through a chain of isolated motor impulses, and each impulse is responsible for only one element of the graphic structure. With practice, this structure of the process is radically altered, and writing is converted into a single "kinetic melody."*
- Formation of each individual letter consists of a unique sequence of movements that defines it and makes it different from every other letter form.
- Teaching one way (a specific sequence of movements) to form each individual letter—and forming the letter the same way every time it is written—supports progress toward automatic letter formation—the goal of learning to write by hand.
- Handwriting is not functional until it has become automatic.
- Keyboarding is not fully functional until it is possible to type without looking at the keys.

59

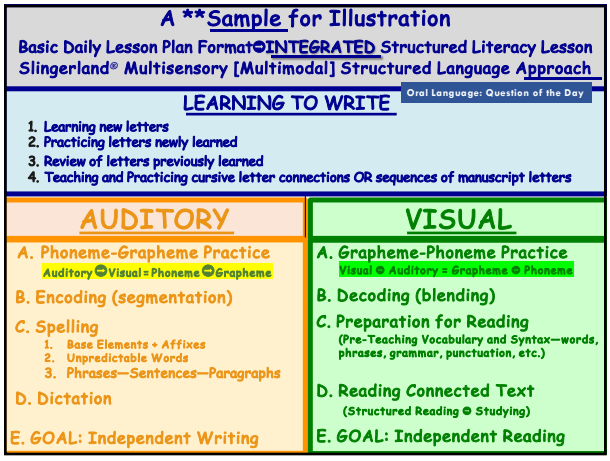
59

What Does It Take to Learn to Write???

- Learning to write is not a phenomenal learning. Writing requires instruction. Writing must be taught.
- Handwriting should NOT be taught in isolation—but integrated throughout the daily Structured Literacy teaching format—from skills to functional use.
- "What our research and other people's research is showing is, starting around kindergarten, first grade, kids really do best when you integrate writing with the reading" … (Virginia Berninger)
- Begin with handwriting and spelling instruction and have them use both functionally through guided targeted practice and as they put their own ideas on paper.

60

60



61

Direct Explicit Handwriting Instruction

- Kinesthetic memory is the earliest, strongest and most reliable form of memory (Sheffield, 1996).
- Gross Motor Movement (*l a s u m/m*)
  - Whole Arm
  - Straight Wrist
  - Writing in Air
- Tracing a Model—large enough to ensure whole arm movement during tracing
- Using words to tell arm/hand how to form letter
- Unique sequence of movements for formation of each letter
- Naming each letter as it is formed

62

62

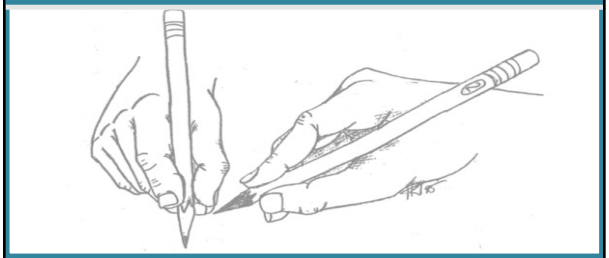
Optimum Sitting Position for Writing

- Both feet flat on the floor
- Both hands on the desk
  - Writing hand holding the pencil
  - Non-writing hand anchoring the paper during writing (holding hand)
- Back straight
- Slight forward lean
- Desk clear

63

63

Tripod Pencil Grip→Pinch-Rest-Lean
What a Difference a Pencil Grip Can Make



Reduces fatigue and strain on the hand
Encourages fluent, rather than jerky writing
Paves the road to automaticity

64

Tripod Pencil Grip→Pinch-Rest-Lean
What a Difference a Pencil Grip Can Make



65

...a work in progress...

Practice Makes Permanent

("sort of" to the tune of "God Bless America")

Practice makes permanent, day after day.
With your PENCIL grip and your PAPER slant
And the LETters you PLAN, write, and say.
With your FEET flat and your BACK straight,
And your PINCH, rest, and lean.
The goal is for your WRI-ting.
To reach au-to-ma-TIC-ity.

©1990+ NCW et al.

66

66

Paper Position

- Slanted for cursive letter formation
  - Left-Handed Writers → left corner up*
  - Right-Handed Writers → right corner up*
- Straight for manuscript letter formation

*Can put strip of tape on desk to remind student of slant position

67

67

Paper Size and Lines

- When teaching individual letter formation, begin with paper that ensures large motor movements during tracing.
- As students progress toward automaticity, paper size—and width of lines—may be reduced.
- Remember → Kinesthetic (muscle) memory is the earliest, strongest and most reliable form of memory (Sheffield, 1996).

68

68

A **Sample for Illustration

Basic Daily Lesson Plan Format©INTEGRATED Structured Literacy Lesson
Slingerland® Multisensory [Multimodal] Structured Language Approach

Oral Language: Question of the Day

LEARNING TO WRITE

1. Learning new letters
2. Practicing letters newly learned
3. Review of letters previously learned
4. Teaching and Practicing cursive letter connections OR sequences of manuscript letters

AUDITORY	VISUAL
A. Phoneme-Grapheme Practice Auditory © Visual = Phoneme © Grapheme	A. Grapheme-Phoneme Practice Visual © Auditory = Grapheme © Phoneme
B. Encoding (segmentation)	B. Decoding (blending)
C. Spelling 1. Base Elements + Affixes 2. Unpredictable Words 3. Phrases—Sentences—Paragraphs	C. Preparation for Reading (Pre-Teaching Vocabulary and Syntax—words, phrases, grammar, punctuation, etc.)
D. Dictation	D. Reading Connected Text (Structured Reading © Studying)
E. GOAL: Independent Writing	E. GOAL: Independent Reading

69

Teaching a New Letter

Learning to Write 2a

I. Learning New Letters

1. **Name letter.**
   T: Shows wall card. Places hand under lower case letter. Names letter.
   S: Names the letter (each student in the class)

2. **Show how to form letter.**
   T: Forms large letter on the board, naming letter as it is formed, verbally stressing difficult parts.
   S: Tells how to form letter as teacher writes on board (*no fwas*)*.

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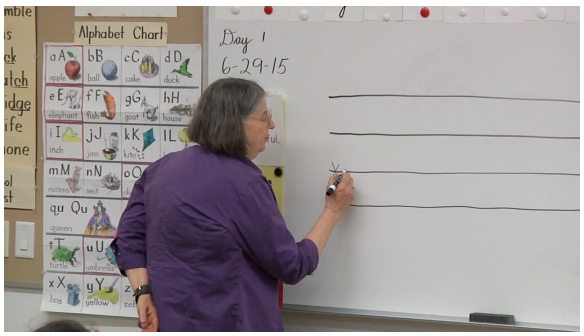
70

70

Teaching a new letter—step 1



.46

71

Teaching a new letter—step 2



1:10

72

Importance of Letter Names

- The name of a letter is its most stable property.
- The shape of a letter may change *[e.g., upper-lower case forms, cursive-manuscript].*
- The speech sound represented by that letter may vary *[e.g., long or short vowel sound, hard or soft c or g].*

73

73

Teaching a New Letter

2b-OPTIONAL

Learning to Write

I. Learning New Letters

OPTIONAL **3. Several students trace at board (optional as needed)**
T: Makes several patterns on the board.
S: Tells how to form letter while teacher traces one letter pattern on board (*no fwas*)*.

AS NEEDED: Individual students—*one at a time*—trace patterns on board.

OPTIONAL **4. Permanent Pattern (optional as needed)**
-FINGERS
T: Gives individual prepared, permanent patterns.
C: Traces and names, using two fingers.
-BLUNT END OF PENCIL
C: Traces and names, using blunt end of pencil.

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74

74

Teaching a New Letter

Learning to Write 2c

I. Learning New Letters
5. Expendable Pattern
T: Gives expendable pattern to each student.
(*3-fold/1 writing (wr) line/175-01 paper*)

DRAW DIAGRAM OF PAPER WITH ALL LINES/FOLDS AND SAMPLE LETTER PATTERN.

A. Trace
S/C: Traces, naming letter, while using
-Two fingers
-Blunt end
-Lead end

B. Copy
S/C: Marks baseline. Plans while naming using two fingers, blunt end, lead end.
S/C: Copies, then traces teacher's pattern, until teacher corrects.
T: Checks and corrects each student's letter as needed
S/C: Traces, naming.

C. Write from Memory
S/C: Folds paper over, covering first two sections, marks baseline, plans (*fingers, blunt end*).
S/C: Writes from memory.
T: Corrects, if needed.
S/C: Traces, naming.

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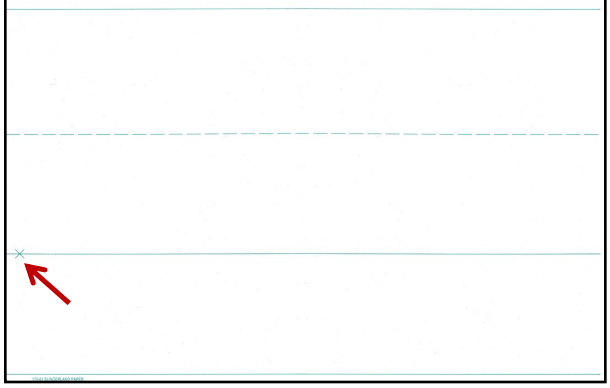
75

75

Teaching a new letter:
expendable pattern—1 writing line



76

Teaching a new letter:
expendable pattern—1 writing line



3:33

77

Practicing Letters Newly Learned

Learning to Write 3

II. Practicing Letters after Teaching
(List of New, or Difficult, Letters to be Practiced)
(back of 3-fold/1 writing (wr) line/175-01 paper with pattern)

C: Turns paper over.
T: Names letter.
S: *(1)* Tells teacher how to write letter on board while *fwas*
OR
(2) Forms letter in air (*fwas*), naming.
C: Marks baseline; plans while naming using two fingers, blunt end of pencil.
C: Writes letter, naming.
T: Corrects, if necessary.
C: Traces and names letter.

T: Repeats above with a different letter for each of the two remaining spaces.

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78

78

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3. Review of letters previously learned
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B. Encoding (segmentation)	B. Decoding (blending)
C. Spelling 1. Base Elements + Affixes 2. Unpredictable Words 3. Phrases—Sentences—Paragraphs	C. Preparation for Reading (Pre-Teaching Vocabulary and Syntax—words, phrases, grammar, punctuation, etc.)
D. Dictation	D. Reading Connected Text (Structured Reading ⛀ Studying)
E. GOAL: Independent Writing	E. GOAL: Independent Reading

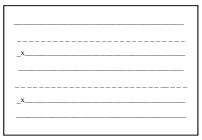
79

Review of letters previously learned

III. Reviewing Letters *(List of Single Letters to be Reviewed)* **4a**

Indicate Progression: #1 #2 #3 #4. (6-fold/2 writing lines/200-02 paper)

1. **Progression #1**
   - T: Names letter.
   - S: Tells teacher how to form letter while *fwas*.
   - T: Forms on board as instructed by student.
   - C: *Fwas*, naming; plans, writes on paper, naming; proofreads.
   - T: Corrects.
   - C: Traces and names.
2. **Progression #2**
   - T: Names letter.
   - S: *Fwas*, naming.
   - C: *Fwas*, naming; plans, writes on paper, naming; proofreads.
   - T: Corrects.
   - C: Traces, naming.
3. **Progression #3**
   - T: Names letter.
   - C: *Fwas*, naming; plans, writes on paper, naming; proofreads.
   - T: Corrects.
   - C: Traces, naming.
4. **Progression #4**
   - T: Names letter.
   - C: Plans, writes on paper, naming; proofreads.
   - T: Checks if needed.
   - T/S: Corrects if necessary.
   - C: Traces, naming.



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Slingerland MSL Approach

80

80

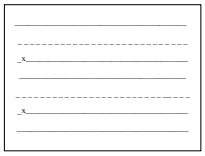
Review of letters previously learned

Teaching and Practicing letter connections (Cursive)
Teaching and Practicing letter sequences (Manuscript)

Teaching Cursive Letter Connections *(List of Cursive Letter Connections)* **4b**

Indicate Progression: #1 #2 #3 #4. __6-fold/2 writing lines/200-02 paper
Use expendable patterns to teach difficult connections.

1. **Progression #1**
   - T: Names letters.
   - S: Tells teacher how to form letters **while *fwas***.
   - T: Forms on board as instructed by student (models planning).
   - C: *Fwas*, naming; plans, writes on paper, naming; proofreads.
   - T: Corrects.
   - C: Traces and names.
2. **Progression #2**
   - T: Names letters.
   - S: *Fwas*, naming.
   - C: *Fwas*, naming; plans, writes on paper, naming; proofreads.
   - T: Corrects.
   - C: Traces, naming.
3. **Progression #3**
   - T: Names letters.
   - C: *Fwas*, naming; plans, writes on paper, naming; proofreads.
   - T: Corrects.
   - C: Traces, naming.
4. **Progression #4**
   - T: Names letters.
   - C: Plans, writes, naming; proofreads.
   - T: Checks, if needed.
   - T/S: Corrects if necessary.
   - C: Traces, naming.



SSS-TT-2012 NCW
Slingerland MSL Approach

81

81

Review of letters previously learned: 2 writing lines
Teaching and Practicing letter connections (Cursive)
Teaching and Practicing letter sequences (Manuscript)

82

Review: cursive letter connections— 2 writing lines



1:18

83

Review of letters previously learned: 3 writing lines
Teaching and Practicing letter connections (Cursive)
Teaching and Practicing letter sequences (Manuscript)

84

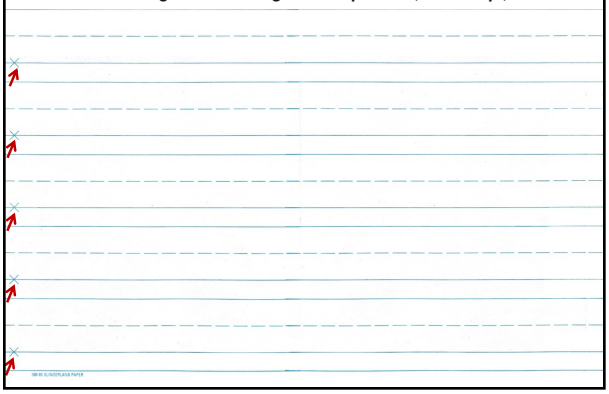
**Review: cursive letter connections—
3 writing lines**



1:28

85

Review of letters previously learned: 5 writing lines
Teaching and Practicing letter connections (Cursive)
Teaching and Practicing letter sequences (Manuscript)



86

Practice Makes Permanent

- "An act is not properly learned as long as it requires visual supervision. An oarsman can row as well in the dark. He does not need to look at the oars. His muscles direct him." —Unknown
- "As I write, my mind is not preoccupied with how my fingers form the letters; my attention is fixed simply on the thought the words express. But there was a time when the formation of the letters, as each one was written, would have occupied my whole attention." —Sir Charles Sherrington, 1906
- Secure motor patterns eventually allow handwriting to become such a habitual skill that the mind is free to think while the arm and hand automatically produce the words chosen by the mind."—Getman, 1984

87

87

Two VERY BIG Ideas to Remember

- Kinesthetic memory is the earliest, strongest and most reliable form of memory (Betty Sheffield, 1996).
- Speed is not the road to success. Careful practice is the road to speed.

88

88

Copying Is Important
Copying Needs to Be Taught

- Students need to be able to copy accurately.
- Teach copying directly, explicitly, and systematically just as other skills are directly taught.*
- Progress from the simple to the complex.
- Provide ample time for guided practice followed by independent practice.
- Build accountability for accurate, efficient copying.

89

89

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COPYING

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A. Phoneme-Grapheme Practice Auditory ⇔ Visual = Phoneme ⇔ Grapheme	A. Grapheme-Phoneme Practice Visual ⇔ Auditory = Grapheme ⇔ Phoneme
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D. Dictation	D. Reading Connected Text (Structured Reading ⇔ Studying)
E. GOAL: Independent Writing	E. GOAL: Independent Reading

90

Teaching a New Concept: Five Steps
Beth Slingerland

GOAL ➡ AUTOMATICITY ➡ INDEPENDENCE

♦from teacher modeling ➡ guided practice ➡ to independent functional use♦

1. Teacher demonstrates, verbalizing each step.
2. Individual students practice with guidance, verbalizing.
3. Class (or group) practices with guidance, verbalizing as needed.
4. Students practice independently (verbalize as needed)
5. INDEPENDENCE IN FUNCTIONAL USE

91

91

Words of Wisdom
Dr. Virginia Berninger

"Literacy instruction drawing on integrated reading and writing is like fine cuisine made from multiple ingredients."

- ◆Beginning in kindergarten, children need to learn to name and write letters.
- ◆Names of letters are retrieval cues for letter forms stored in memory.
- ◆Instruction must include BOTH spelling ➡ sound correspondences— ➡reading AND sound ➡ spelling correspondences— ➡spelling.
  - These correspondences are often different in the reading and spelling directions (Venezky).

92

92

Words of Wisdom
Dr. Virginia Berninger

- ◆Present information to students so they SEE it, SAY it, HEAR it, and FEEL it (when WRITING and SPEAKING).
- ◆These systematic multisensory [multimodal] strategies foster the automatic association of visual, auditory and kinesthetic input so that students are creating necessary auditory-visual, visual-auditory, and auditory-visual-kinesthetic associations regardless of the modality that carries the initial stimulus (visual→reading OR auditory→spelling and written expression).
- ◆Every language task requires the association, or integration, of at least two modalities.

93

93

All language requires the integration of at least two modalities…

- Silent reading
- Copying
- Oral reading
- Speaking

94

94

Multimodal Structured Language Instruction Structured Literacy

- The MSLI teacher plans lessons for groups based on the individual needs of all students within the group.
- The teacher guides students as they practice—never assuming—but constantly moving around the classroom to prevent errors, clarify confusion, and ensure success.
- MSLI includes the teaching of language structure at all levels beginning always with the simplest and smallest unit (a letter) and progressing systematically to words, words with affixes, phrases, sentences, paragraphs—units of concept.
- Every lesson begins with skills instruction and progresses to functional use of skills at higher and higher levels.

95

95

Normal Language Acquisition

Acquisition of Language Skills

Language

↓

Intersensory Functioning

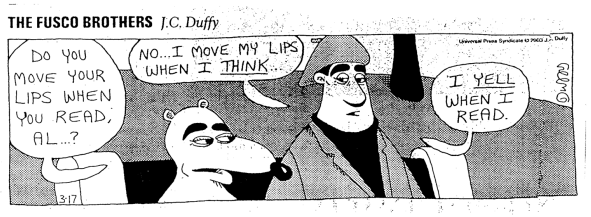
↓

Auditory-Visual-Kinesthetic

- Underlying basic principle is **multisensory**
- **OBJECT**: simultaneous/automatic A-V-K association regardless of which modality carries the initial stimulus

96

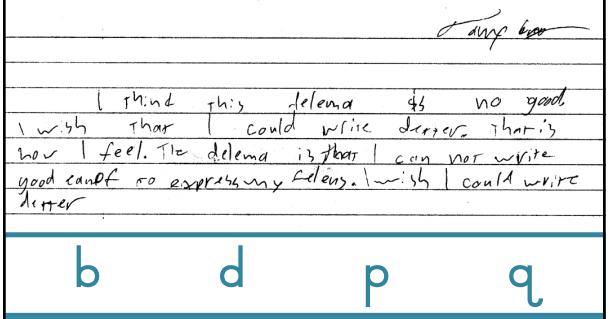
…Subvocalization



97

Dilemma of a 13-year old…

b's and d's and other confusing letters



b d p q

98

98

Symmetry, Reading, and Neuronal Recycling
Do people with dyslexia see things backwards?
Dehaene—2009

- Most properties within the visual circuits of children's brains are useful for reading—but one is detrimental: generalization across mirror images.
- This ancient property explains why most children make reversal errors when they begin learning to read and write.
  - They see the letters <b> and <d> as though they were the same object viewed from two different angles or perspectives. Tiger analogy… bicycle … chair …
- Letter discrimination makes it necessary to "unlearn" this spontaneous competence for mirror-image generalization.

99

People with Dyslexia Do Not See Letters Backwards

- People with dyslexia have difficulty remembering labels associated with specific letters that are visually similar.
- Poor decoding strategies ➔ Reliance on visual memory for how words *look.*
  - *They often guess the incorrect label for a group of letters that appear visually similar.*
  - visual➔auditory (verbal) integration

100

100

Reading and Writing and Reversals

Reading in the Brain: The New Science of How We Read (p. 264)
Stanislas Dehaene

- "Mirror writing occurs in all cultures, including China and Japan.
- It appears for a short period of time at the age when children first begin to write, and then promptly vanishes." True for most children…but not all.
- At later ages, reversals are indeed more frequent in children with dyslexia…and intervention is generally required to eliminate them.

101

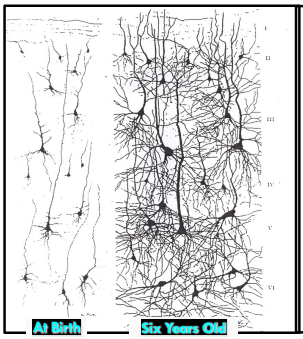
What makes learning stick?…

- **Practice Makes Permanent**
  - Be certain that what you practice IS what you want to become permanent.

-Joyce Steeves

102

Growth of the Language Cortex
from Birth to 6 Years



- Learning happens when networks of dendrites grow
- When new dendrites sprout from existing dendrites, new knowledge is added to what is already known → like a tree sprouting twigs from existing branches.
- Growing dendrites takes time and practice.
- PRACTICE MAKES PERMANENT!!!!!!

From *Inside the Brain by Ojemann & Calvin, 1980*

103

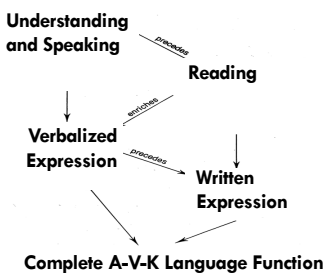
Anita Archer…

DRILL ➡ SKILL ➡ THRILL

104

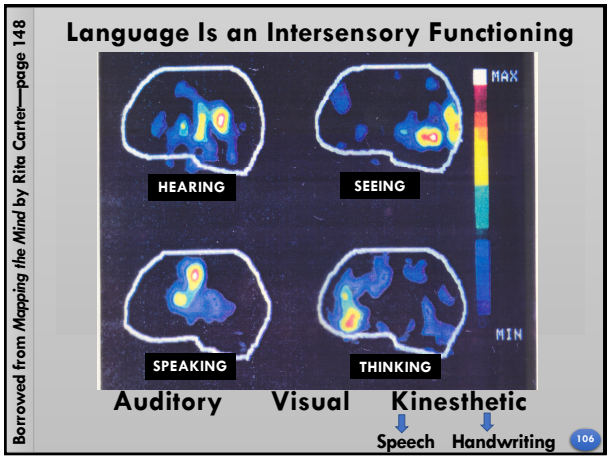
104

Global Development of Normally Acquired Language Function
Oral Language is the Foundation of Literacy
Beth Slingerland

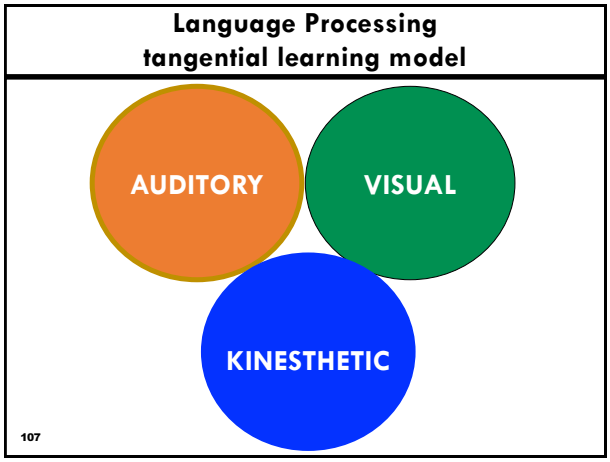


Complete Auditory-Visual-Kinesthetic A-V-K Language Function for
Oral Language
Reading
Written Expression

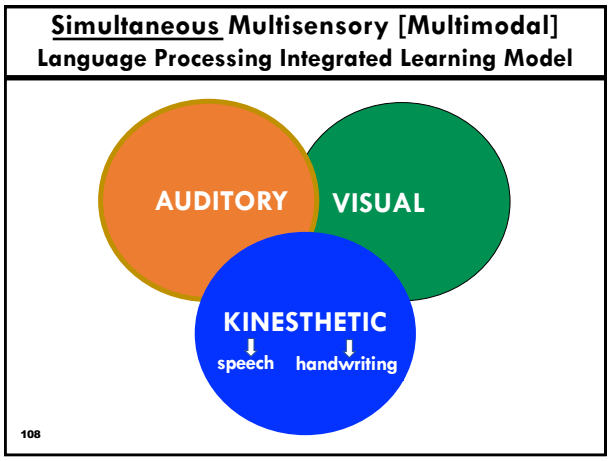
105


Language Is an Intersensory Functioning
Borrowed from Mapping the Mind by Rita Carter—page 148
HEARING
SEEING
SPEAKING
THINKING
MAX
MIN
Auditory
Visual
Kinesthetic
Speech
Handwriting
106

106


Language Processing
tangential learning model
AUDITORY
VISUAL
KINESTHETIC
107

107


Simultaneous Multisensory [Multimodal]
Language Processing Integrated Learning Model
AUDITORY
VISUAL
KINESTHETIC
speech
handwriting
108

108

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C. Spelling 1. Base Elements + Affixes 2. Unpredictable Words 3. Phrases—Sentences—Paragraphs	C. Preparation for Reading (Pre-Teaching Vocabulary and Syntax—words, phrases, grammar, punctuation, etc.)
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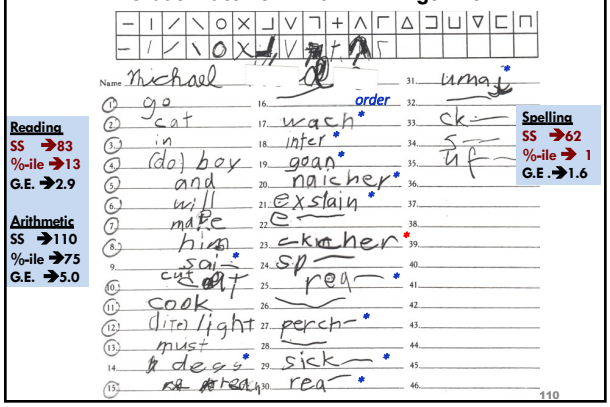
E. GOAL: Independent Writing	E. GOAL: Independent Reading

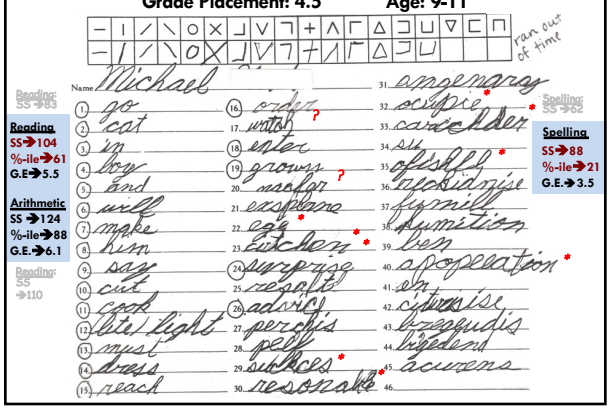
109

What about Simultaneous Multisensory Instruction?
Grade Placement: 4.0 Age: 9-6



110

What about Simultaneous Multisensory Instruction?
Grade Placement: 4.5 Age: 9-11



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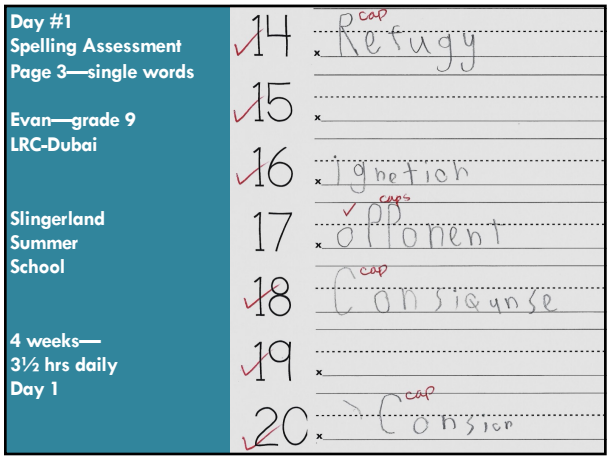
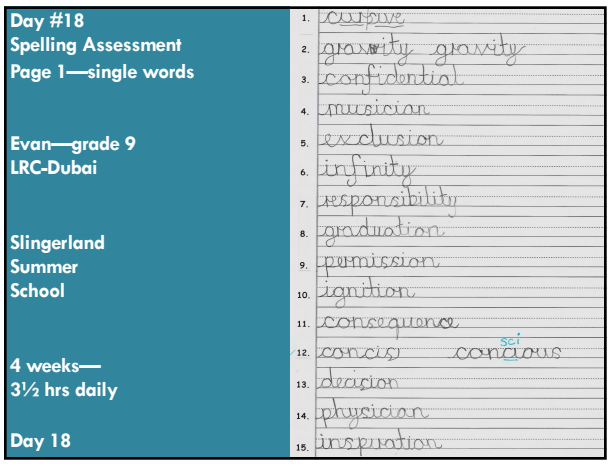
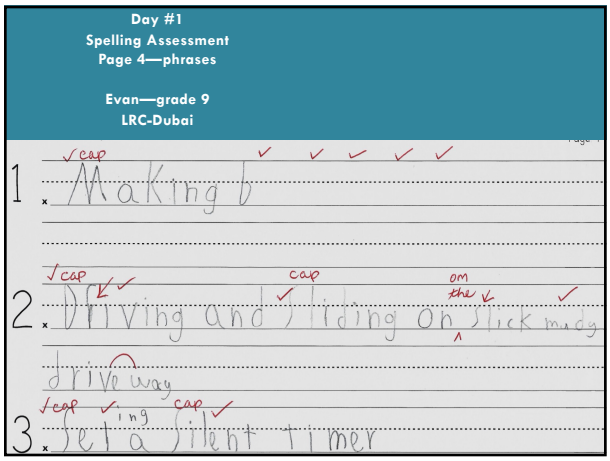

Day #1
Spelling Assessment
Page 3—single words
Evan—grade 9
LRC-Dubai
Slingerland
Summer
School
4 weeks—
3½ hrs daily
Day 1
14 Refugy
15
16 Ignetich
17 ppponent
18 Consignse
19
20 Conzion

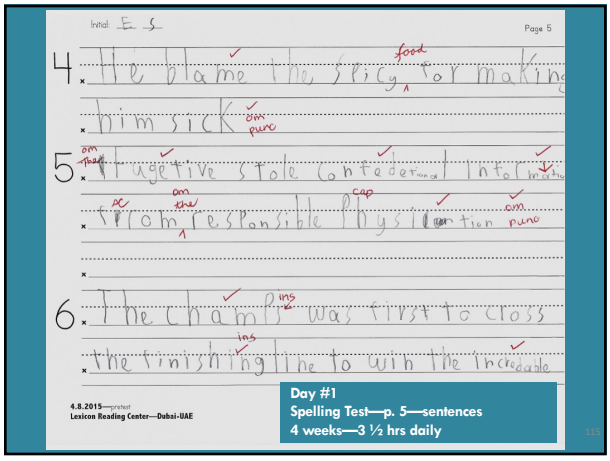
112


Day #18
Spelling Assessment
Page 1—single words
Evan—grade 9
LRC-Dubai
Slingerland
Summer
School
4 weeks—
3½ hrs daily
Day 18
1. curve
2. gravity gravity
3. confidential
4. musician
5. exclusion
6. infinity
7. responsibility
8. graduation
9. permission
10. ignition
11. consequence
12. concis conscious
13. decision
14. physician
15. inspiration

113


Day #1
Spelling Assessment
Page 4—phrases
Evan—grade 9
LRC-Dubai
1 Making b
2 Driving and sliding on slick mudg
drive way
3 Set a silent timer

114



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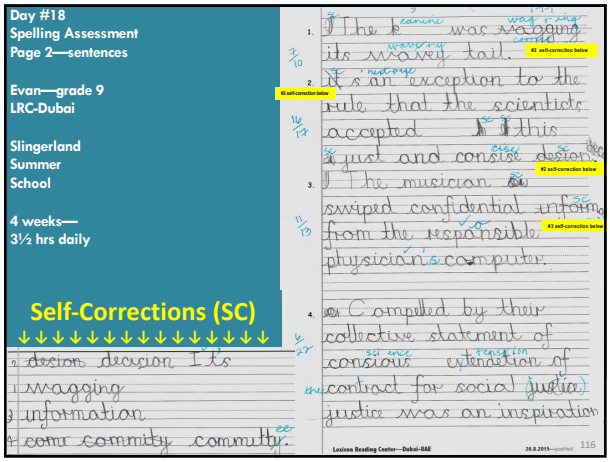


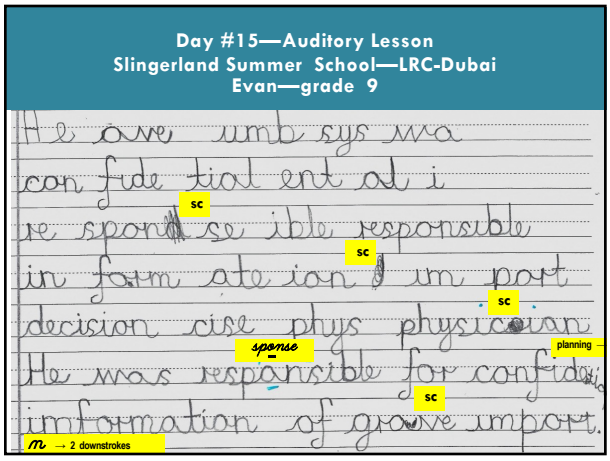
116

Kinesthetic:

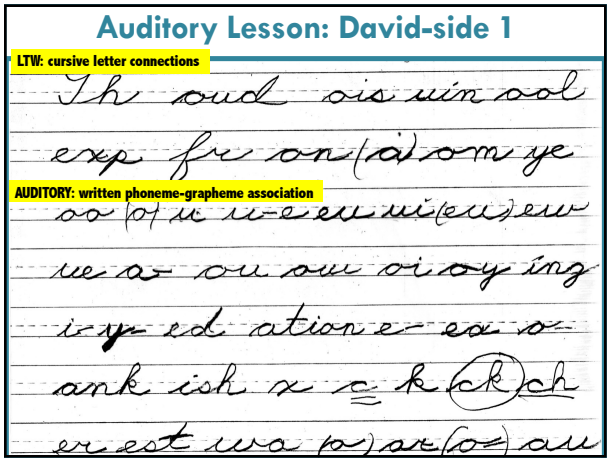
- Helping each student develop awareness:
  - The oral-motor movement for pronunciation of each phoneme—*unique sequence of movements*
  - The sequence of hand movements for formation of each letter of the alphabet—*unique sequence of movements*

117

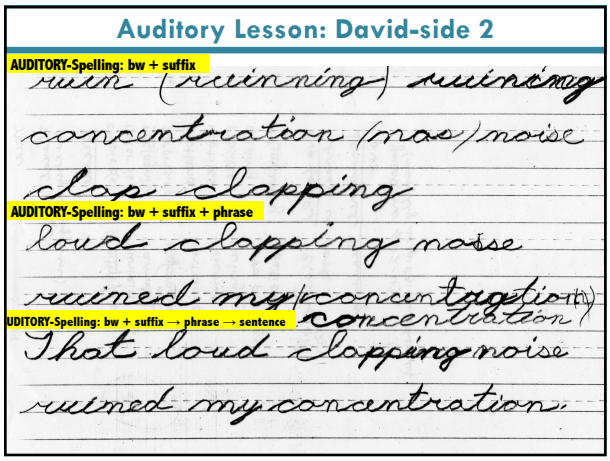
117


Day #15—Auditory Lesson
Slingerland Summer School—LRC-Dubai
Evan—grade 9
sc
sc
sc
sponse
planning
sc
→ 2 downstrokes

118

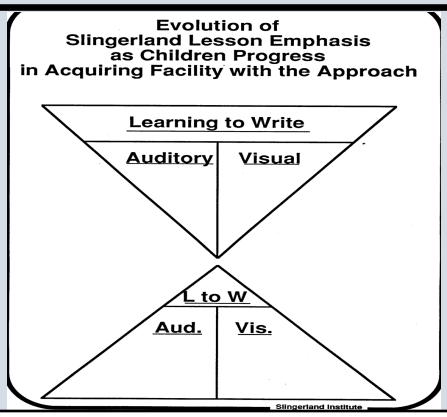

Auditory Lesson: David-side 1
LTW: cursive letter connections
AUDITORY: written phoneme-grapheme association

119


Auditory Lesson: David-side 2
AUDITORY-Spelling: bw + suffix
AUDITORY-Spelling: bw + suffix + phrase
AUDITORY-Spelling: bw + suffix → phrase → sentence

120

From Skills to Functional Use



121

Functional Use

AUDITORY	VISUAL
C. SPELLING	C. PREPARATION FOR READING
"ear span"	"eye span"
who/what/when/ where/why/how	who/what/when/ where/why/how
• Punctuation	• Punctuation
• Vocabulary	• Vocabulary
• Rhythm	• Rhythm
• Phrases	• Phrases
• Clauses	• Clauses
• Grammar	• Grammar
• Concept Markers	• Concept Markers

122

122

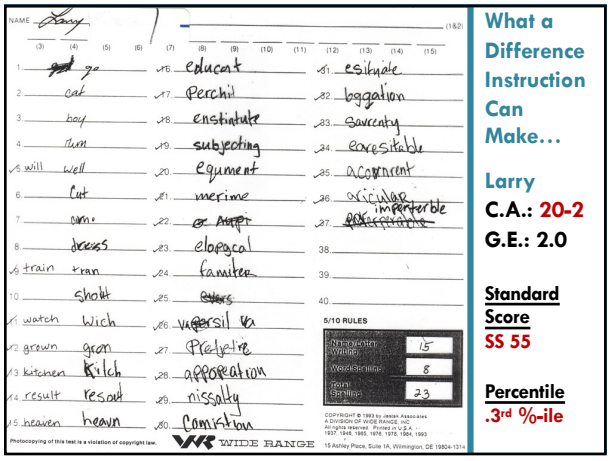
Pre-Trial Diversion Students
MENTOR COURT PROJECT
SAN FRANCISCO SUPERIOR COURT

- ❑STUDENTS:
  - young adults 18 to 24 years
- ❑INSTRUCTIONAL APPROACH:
  - Slingerland Multisensory[Multimodal] Structured Language Approach
- ❑INSTRUCTIONAL FORMAT:
  - small group of 6 students
- ❑INTENSITY AND DURATION OF INSTRUCTION:
  - 12 months @ 2 hours of instruction per wk

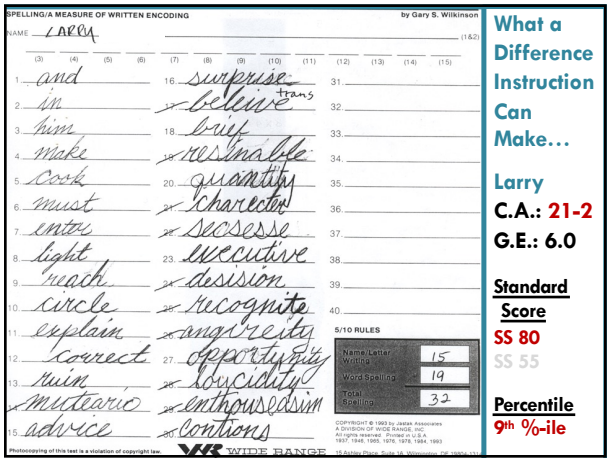
123

123

Has Handwriting Become an Instructional Dinosaur?
Handwriting May Be More Important Than You Think!
Best Practices for Teaching Handwriting
Nancy Cushen White, Ed.D.



124



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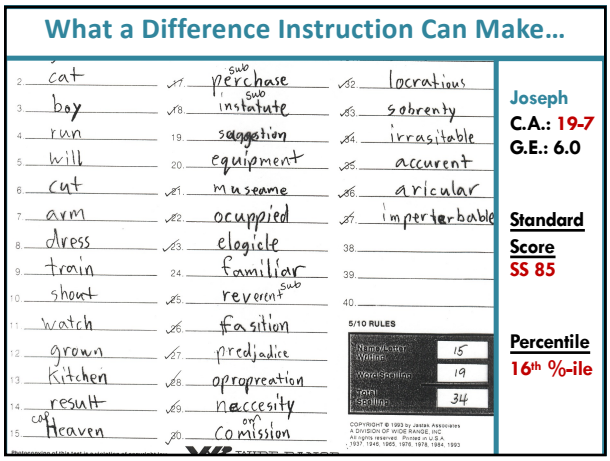
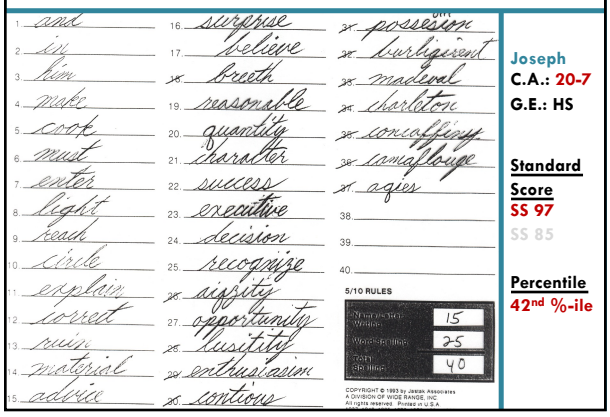


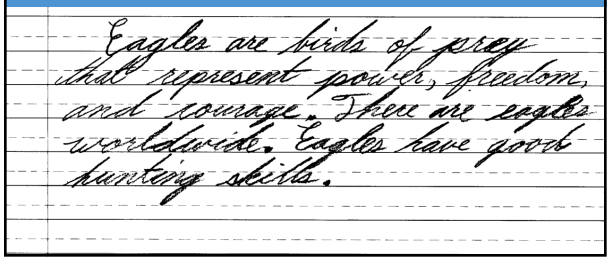
126

What a Difference Instruction Can Make…



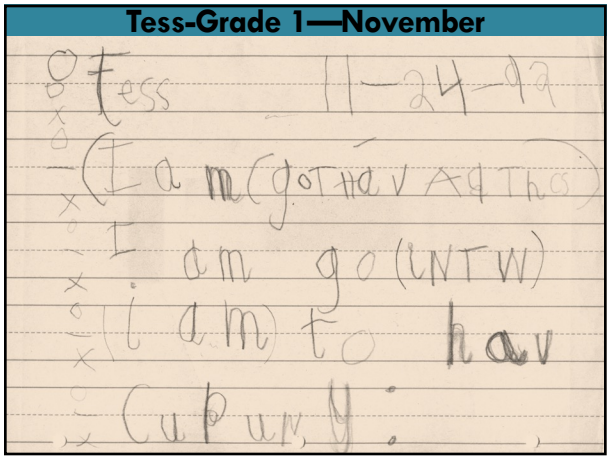
127

What a Difference Instruction Can Make
Pre-Trial Diversion Project—Mentor Court
San Francisco Superior Court
Joseph



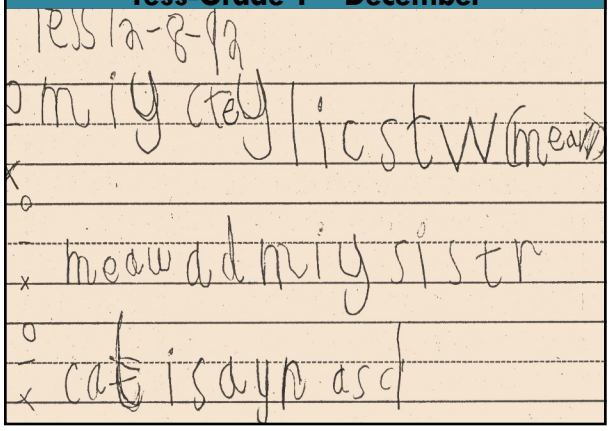
128

Tess-Grade 1—November



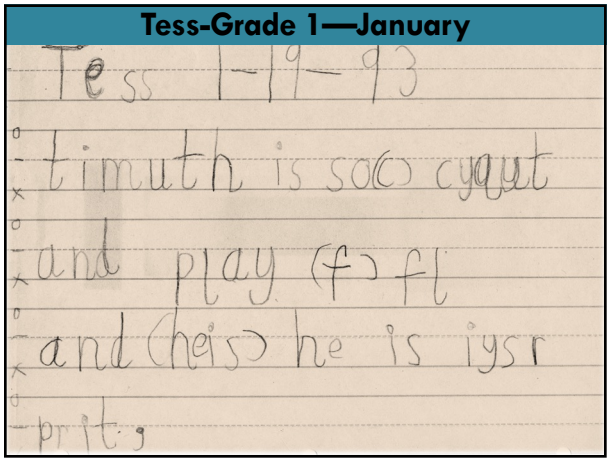
129

Tess-Grade 1—December



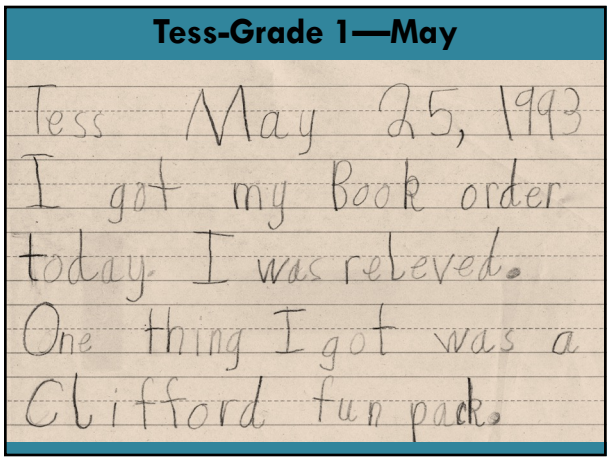
130

Tess-Grade 1—January



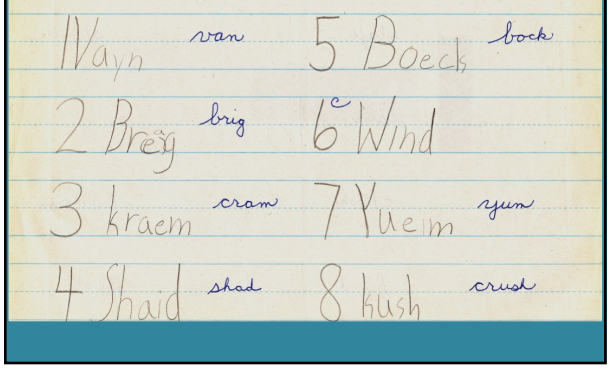
131

Tess-Grade 1—May



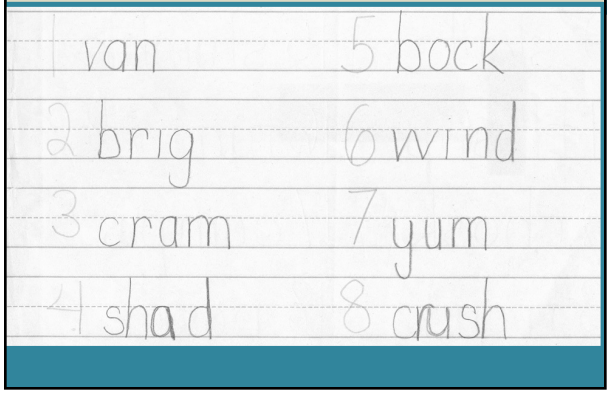
132

Jessica: Day 1 Spelling Test



133

Jessica: Day 19 Spelling Test



134

The Perils of Effortful Letter Formation

Virginia Berninger—University of WA-Seattle

Another Big Idea for a Parting Thought

- "Handwriting presents the biggest barrier students must overcome in learning to write.
- The focused thought that young writers must put into how to form letters interferes with other writing processes."

135

135

Know your stuff!

- Know your stuff.
- Know whom you're stuffing.
- Stuff every minute of every lesson.

-coined by a Florida teacher quoted by Dr. Joseph Torgesen-

Knowledge of language is essential for teachers of students with dyslexia.

-Louisa Moats, Ed.D.

136

136

Thank You!

Many thanks for your participation in this webinar.

137

137

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Website—References

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  The International Dyslexia Association
- www.slingerland.org
  Slingerland Institute for Literacy—Provides teacher training using the *Slingerland® Multisensory Structured Language Approach*—a simultaneous, multisensory, structured language approach for teaching language arts to students with dyslexia in the classroom, in small groups, and individually.
  Downloadable manuscript and cursive fonts:
  https://silshop.slingerland.org/SLIKeyboardPrintFont_p/sliprint.htm
  https://silshop.slingerland.org/SLIKeyboardPrintFont_p/slicursive.htm
- www.imslec.org
  International Multisensory Structured Language Education Council (IMSLEC)—Establishes criteria, evaluates, and accredits quality **training courses** for the professional preparation of multisensory structured language education specialists (clinicians and teacher)s.
- www.altaread.org
  Academic Language Therapy Association (ALTA)—Certifies individuals trained in the remediation of written language skills; a national professional member organization.
- www.allianceaccreditation.org
  Alliance for Accreditation and Certification (Alliance)—Promotes standards for quality professional preparation; a united association of organizations concerned with the **accreditation** of Multisensory Structured Language Education (MSLE) training courses and the **certification** of graduates of these courses.
- www.ncld.org
  National Center for Learning Disabilities(NCLD)—Connects parents and others with essential **resources**, provides **educators with evidence-based tools**, and engages **advocates** in **public policy initiatives**.
- www.dyslexia.yale.edu
  Yale Center for Dyslexia and Creativity (NCLD)—Advocacy and public policy.
- www.thereadingleague.org/
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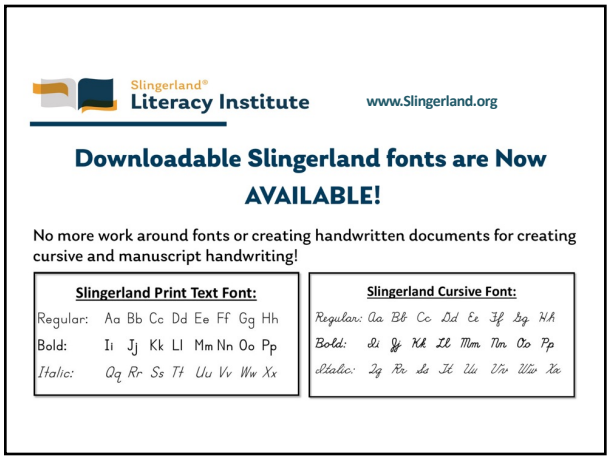
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Bold: Ii Jj Kk Ll Mm Nn Oo Pp
Italic: Qq Rr Ss Tt Uu Vv Ww Xx

142


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NJCLD.org

143