

Get a Grip on Dysgraphia

Carrie Lippincott, OTR/L

June 20, 2017

Sponsored by
Salem Branch of
Decoding Dyslexia

What is Dysgraphia?

- Dysgraphia is unusual difficulties with handwriting and/or spelling.
- When looking at the literature on Dysgraphia, one name tends to be prominent, due to her extensive research in this area:

Virginia W. Berninger, Ph. D

Dr. Berninger is

- A licensed psychologist
- Former general education and special education teacher and reading specialist
- Currently a professor at the University of Washington
- She has been researching learning disabilities for over 30 years!



Structural Brain Differences Found in MRI Studies

These MRI studies suggest that there are structural differences in **three components** of **working memory** used for storing, processing and linguistic reflection.

1st Component

Word – Form Areas

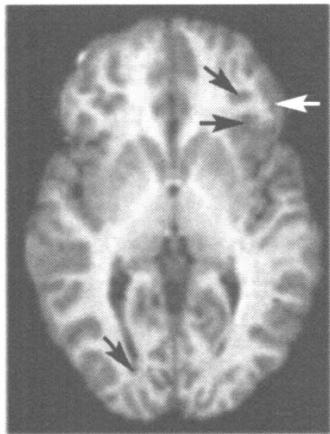
There are three different codes
are used for the
storage and processing of language

1st Component Word – Form Areas

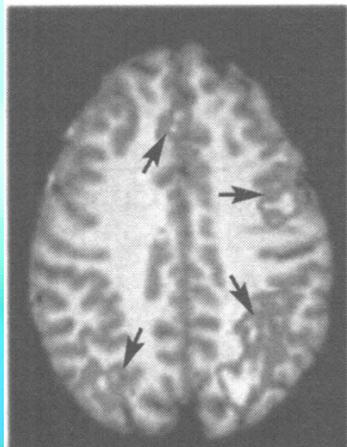
First Coding Type

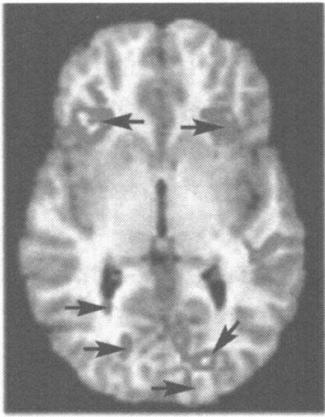
Phonological

These are the
sounds in spoken words

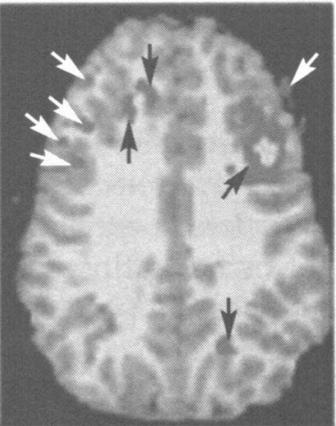


Phonological





Orthographic



1st Component
Word – Form Areas

Second Coding Type

Orthographic

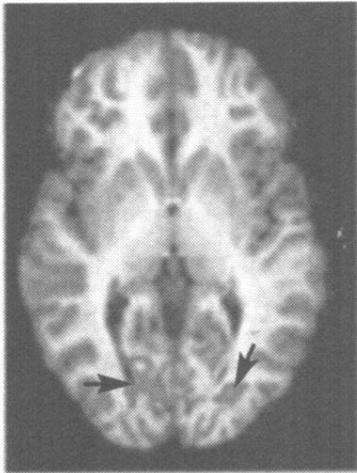
This is the letters or letter groups used in written words which represent speech sounds.

1st Component
Word – Form Areas

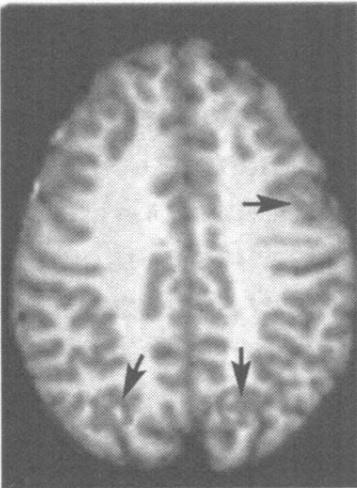
Third Coding Type

Morphological

This is the word parts
which affect a word's
meaning – (prefixes,
endings)



Morphological



2nd Component

Loops

There are two loops which guide the cross-code integration of internal and output codes from one type of code to another.

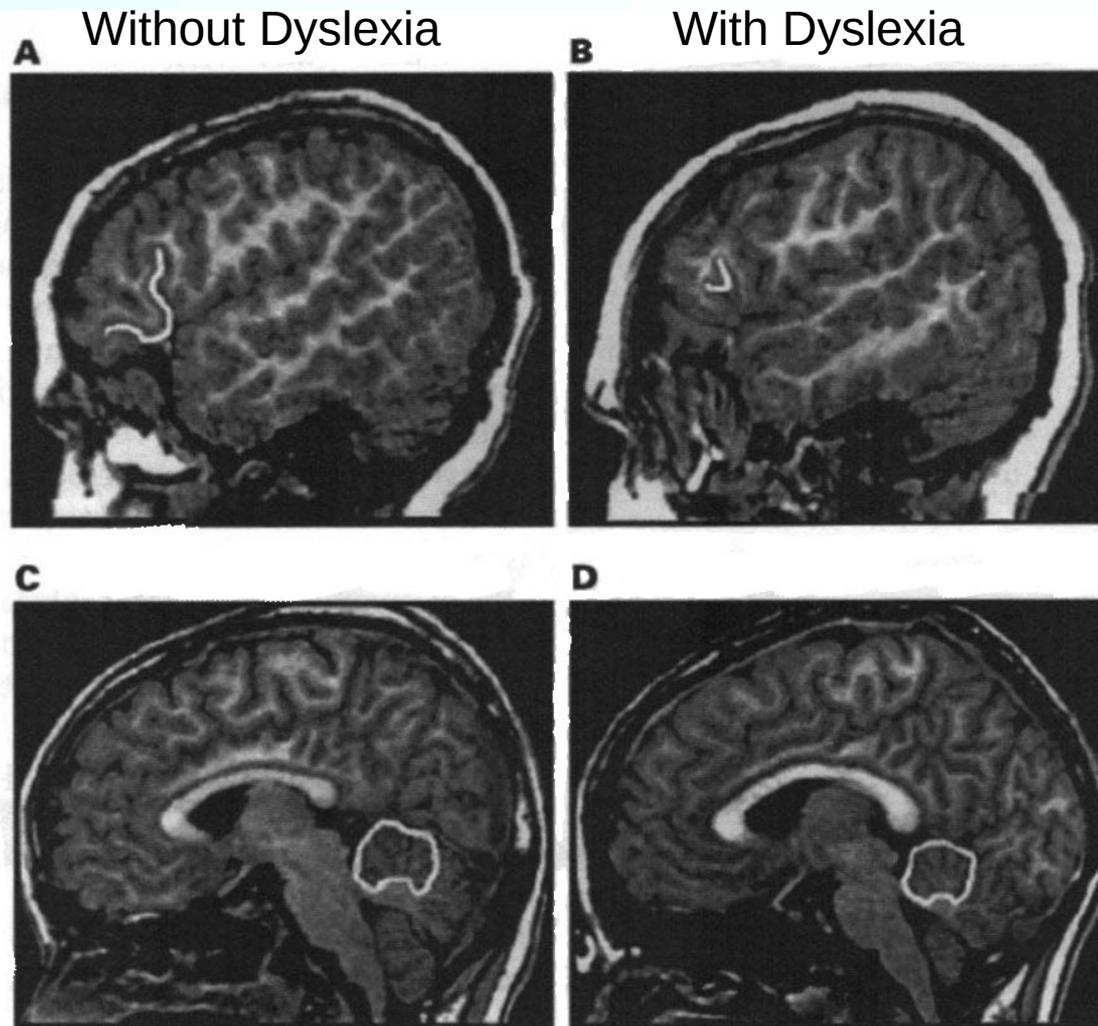
2nd Component Loops

Phonological Loop

This loop is responsible for the oral naming of letters or written words

.

There are neurological differences seen in the phonological loops between children with Dyslexia and without.



This loop is a neural pathway between the left inferior frontal gyrus and the right cerebellum

Figure 7.2. Structural magnetic resonance imaging (MRI) differences between children without dyslexia (left column) and children with dyslexia (right column) in inferior frontal gyrus (larger in good readers in A than in readers with dyslexia in B) and right cerebellum (larger in good readers in C than in poor readers in D). (From Eckert, M., Leonard, C., Richards, T., Aylward, E., Thomson, J., & Berninger, V.W. [2003]. Anatomical correlates of dyslexia: Frontal and cerebellar findings. *Brain*, 126[2], 482–494; reprinted by permission.)

2nd Component Loops

Orthographic Loop

This is the where the letters and words are stored to move sounds to a written product (for guiding the hand/fingers).

3rd Component

Supervisory Attention

This is an executive function of the brain.

(Executive functions are skills everyone uses to organize and act on information.)

There are four types of low-level executive attention functions.

3rd Component
Supervisory Attention

1. Focusing Attention

The ability to inhibit extraneous information from the environment.

3rd Component
Supervisory Attention

2. Switching Attention

This is flexibility allowing one to change focus between tasks.

3rd Component
Supervisory Attention

3. Sustaining Attention

This is the ability to stay on task.

3rd Component
Supervisory Attention

4. Self-Monitoring Attention

This is updating the working memory states of mind or noticing new details.

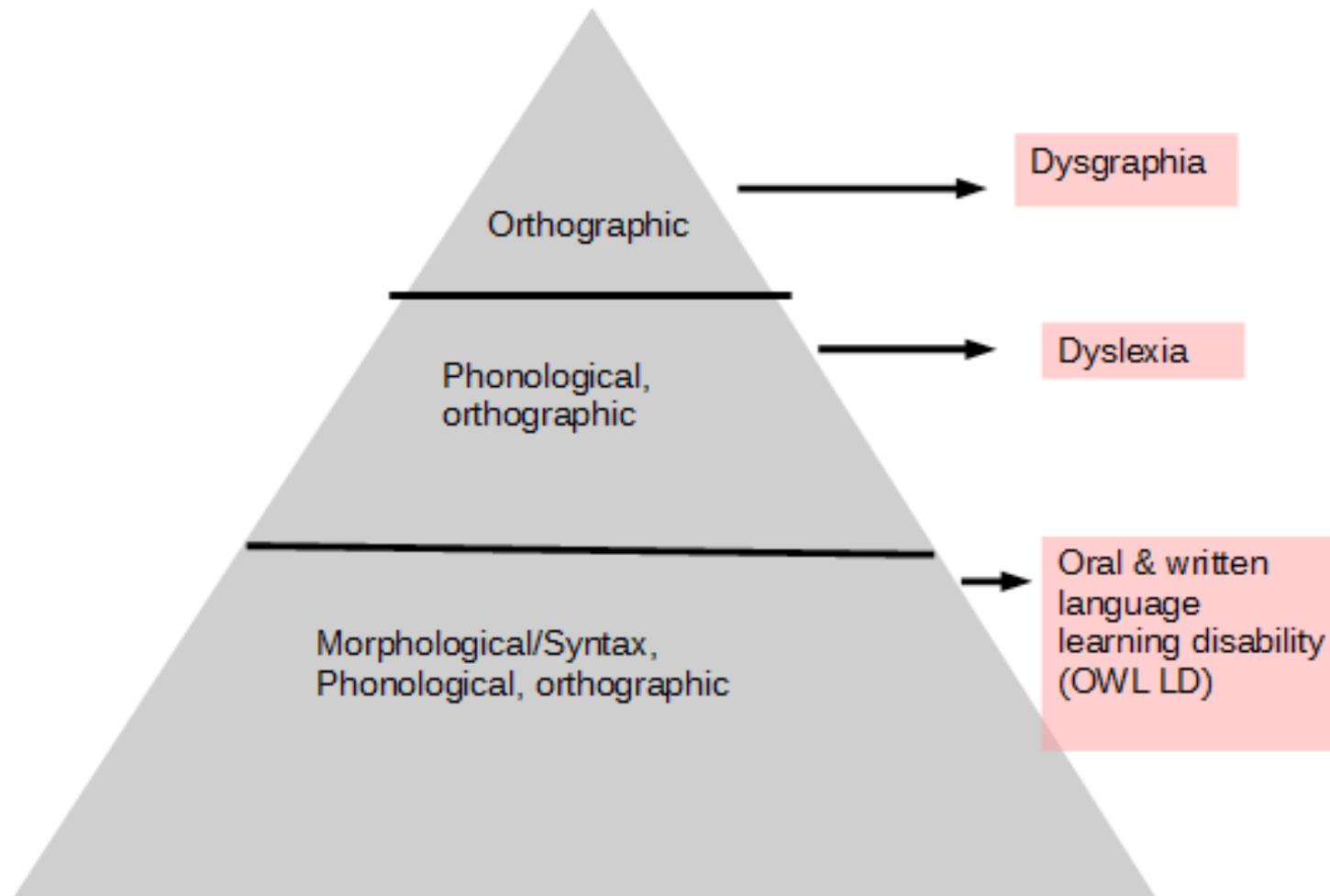
Problems with any of these components can result in a child struggling at school.

Children in Berninger's MRI study reported that they exerted considerably more mental effort and time than their peers in reading and writing.



Proper diagnosis of these issues is crucial to providing children effective help.

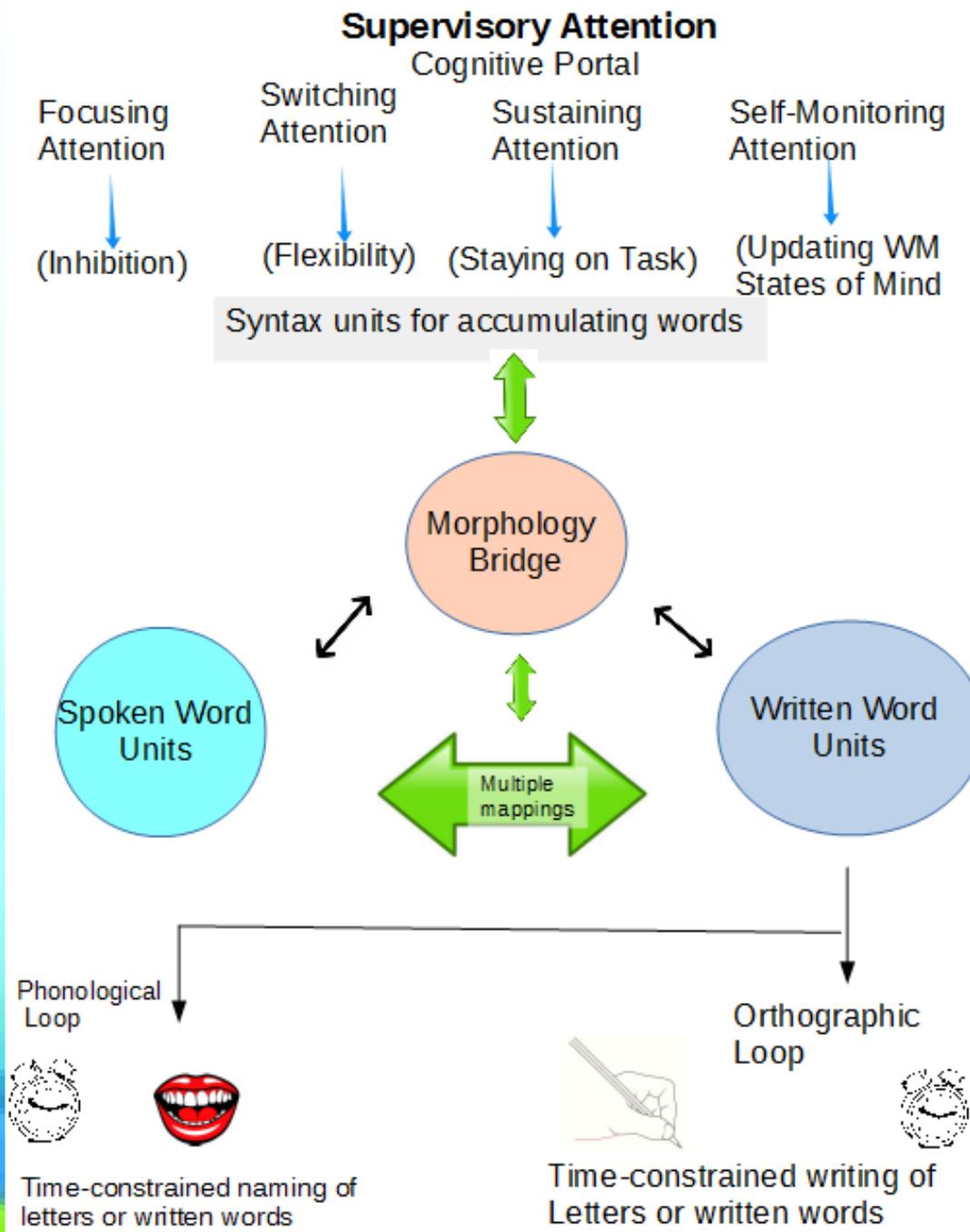
Relationship Between Word-form Deficit and Diagnosis



According to Berninger

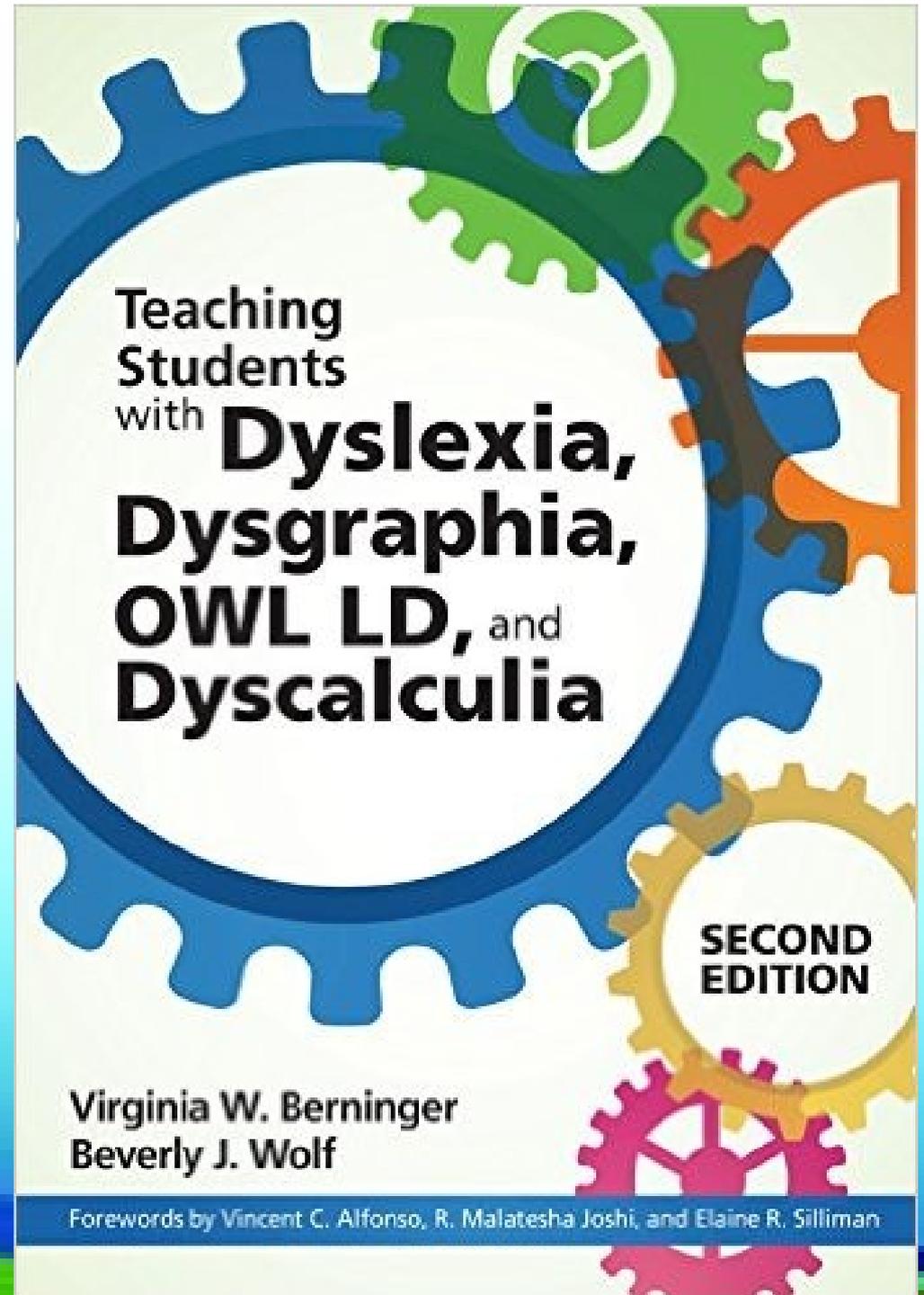
“Not only children with **Dysgraphia**,
but also children with **Dyslexia** and
Oral Written Language Learning Disabilities
have writing difficulties.”

“Dyslexia is not just a reading disorder- it is also a writing disability because of spelling problems that interfere with the development of written composition.”



In this lecture, I will not be discussing how to treat:

- Supervisory Attention
- Morphological Awareness
- Phonological Awareness



Teaching
Students
with **Dyslexia,
Dysgraphia,
OWL LD, and
Dyscalculia**

**SECOND
EDITION**

Virginia W. Berninger
Beverly J. Wolf

Forewords by Vincent C. Alfonso, R. Malatesha Joshi, and Elaine R. Silliman

Audience Activity

What does the brain feel like when it is overloaded with too many demands?

Given the complexity of issues found in dysgraphia, the reported incidence impaired letter form writing by hand may increase

- from 4% in school grades
- to 20% in middle school due to the more complex writing demands.

p. 130, Berninger & Wolf
Teaching Students with Dyslexia & Dysgraphia
1st edition

Treatment of Dysgraphia

Determine the child's hand dominance.

This is crucial for the child's future success in writing.

- *Determining a Student's Hand Dominance for Teachers*
- *Activities to Encourage Hand Dominance*

Available at <http://www.makethegradeot.com>

Assess Visual Motor Skills

To be successful in learning how to write, a child should have sufficient visual motor skills to copy the following shapes:

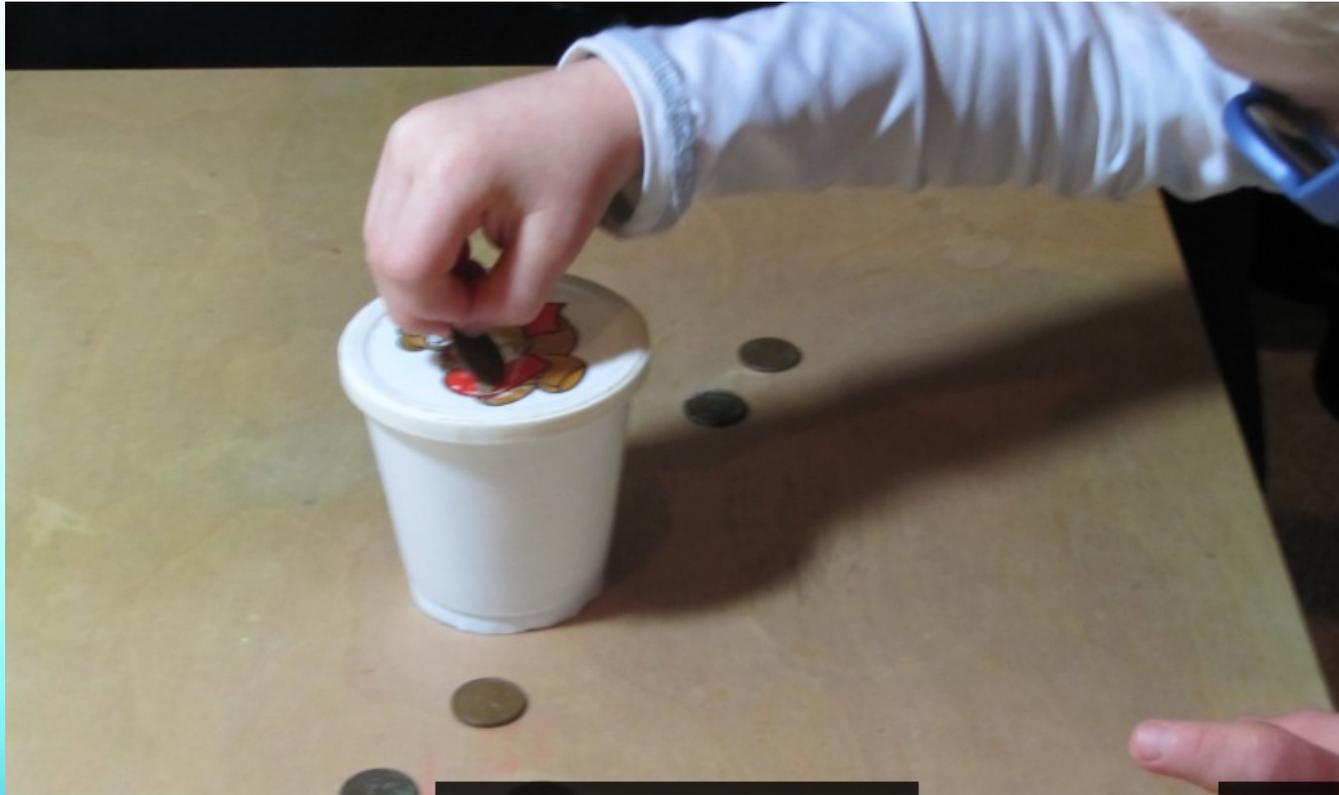
- Lines – vertical, horizontal and both diagonals
- Circle
- Square
- X
- Triangle

Developmental Test of Visual Motor Integration (VMI) 1989

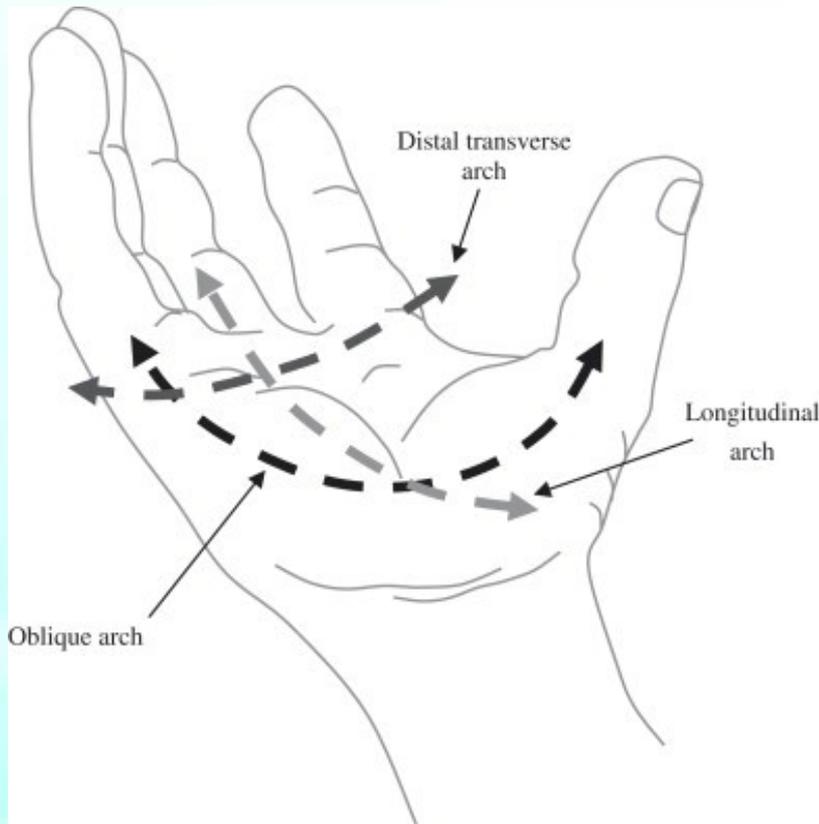
Importance of Fine Motor

- Good hand skills support better manipulation of materials/tools in a child's environment and are the foundation for handwriting.
- New research presented in *Frontiers of Psychology* showed that fine motor skills are a better predictor of a child's math ability, than reading.

Assess the child's fine motor skill



In preparation for writing, the hand should go through the following five motor milestones.



1st Milestone

Development of arches in hand; this is the concave surface of the palm which allows it to shape itself around objects.

Treatment Activities:

- Using rolling pins or dowels.
- Palm Loading How much rice, sand or grape nuts can the child hold?
- Dice Shaking – can you hear the clicking?
- Rolling clay balls in the palms of the hands (like making meatballs)
- Slice the clay snake with a dressmaker wheel
- Opening bottles – practice with different sizes of lids
- Playing with strawberry huller or large tweezers
- Squeeze water toys



2nd Milestone

Development of wrist extension which supports skilled finger movements.

Activities to develop wrist extension

Work on an inclined or vertical surface

Crawling on hands and knees

Pushing large objects around

Audience experiments with
picking up items using wrist
extension & flexion.

3rd Milestone

Development of an awareness of the “skill” side of the hand; this is using the thumb, index and middle fingers for manipulating small objects.

(The other side of the hand is provides stability and strength.)



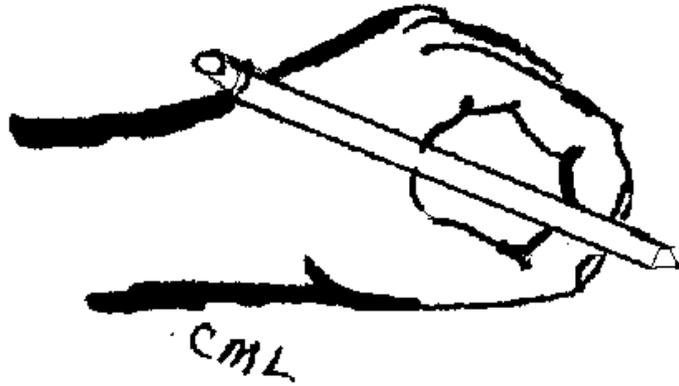
Audience:
Hold up your
hand up in this
shape.

Wiggle thumb,
index & middle
fingers, keep the
ring and little
fingers still.

Now try a pencil or pen tug of war.

See Activities to Develop Separation of the Two Sides of the Hand

Available at makethegradeot.com

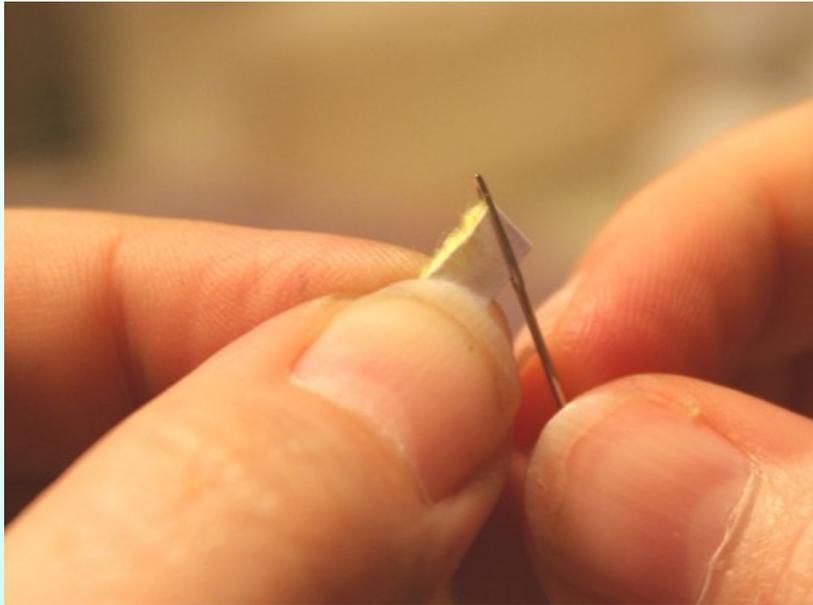


4th Milestone

Development of an open thumb - index finger web space

I explain this to children by saying they need to make an “O” with there thumb and index fingers.

Activities to Develop an Efficient Grasp & Hand Strengthening Activities

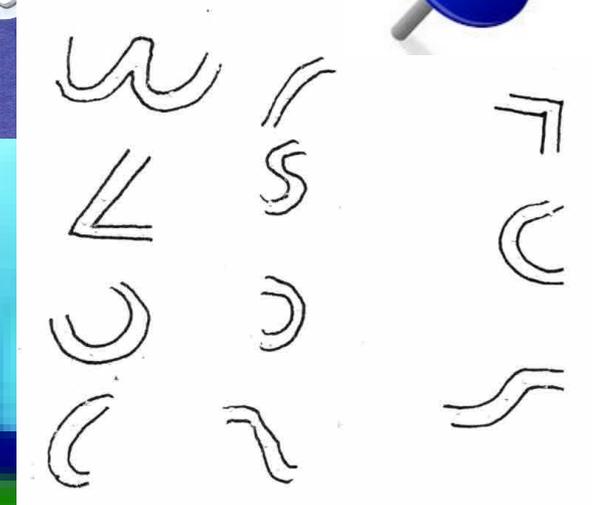
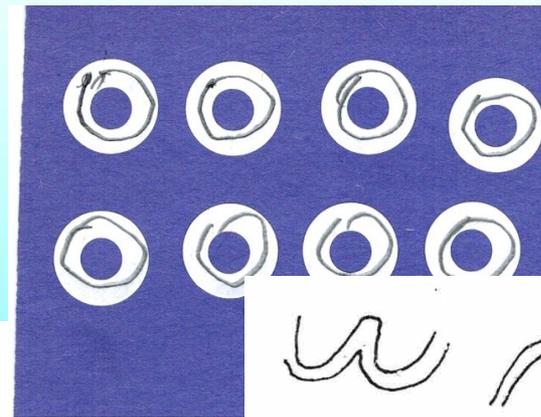


5th Milestone

Development of skill of small muscles contained in the thumb and index/middle fingers, so they can skillfully work together.

Activities to develop control of the distal thumb/index/middle fingers

- threading small beads or pieces of a straw
- drawing “loop pictures”
- drawing coils of 3 or 4 counterclockwise circles on notebook paper, keeping them “stacked up”
- drawing counterclockwise circles on reinforcer circles
- using a pushpin to poke holes in tiny mazes on top of a mouse pad



Keep hand resting on desk surface, ring and little fingers still.

What's Wrong?



Adapt How the Student Writes



Try a variety of grips or pencils to help the student be able to maintain an “O” with the thumb & index finger

See Adaptations to Increase Grip on Writing Utensils

Available at <http://www.makethegradeot.com>



The Crossover Pencil Grip



The Stetro Grip



The Grotto Grip

Do a writing sample of the lowercase alphabet

Time how long it take the child to write it.

Mark with a dot the starting points of letters made wrong.

abcdefghijklmnopqrstuvwxyz

59"

19/26 correct

p

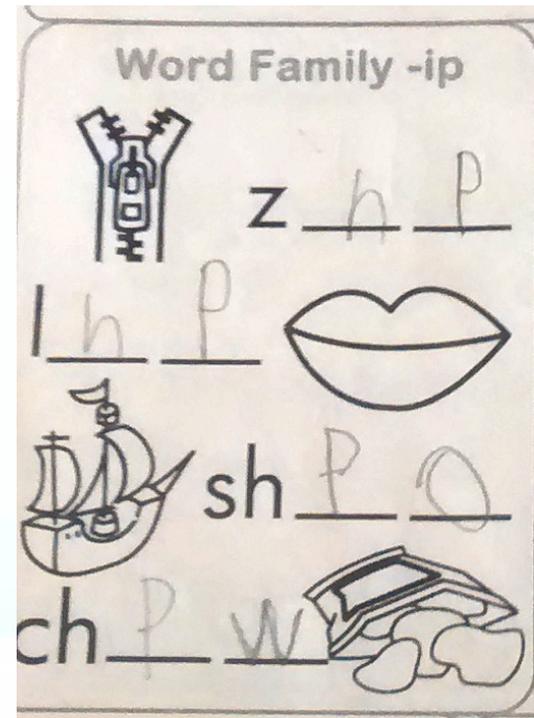


The child should be able to write the alphabet in **25 to 40 seconds** to have their writing fluent enough to be writing automatically

This frees up working memory for working on higher conventions of language.

-First Strokes Handwriting Program

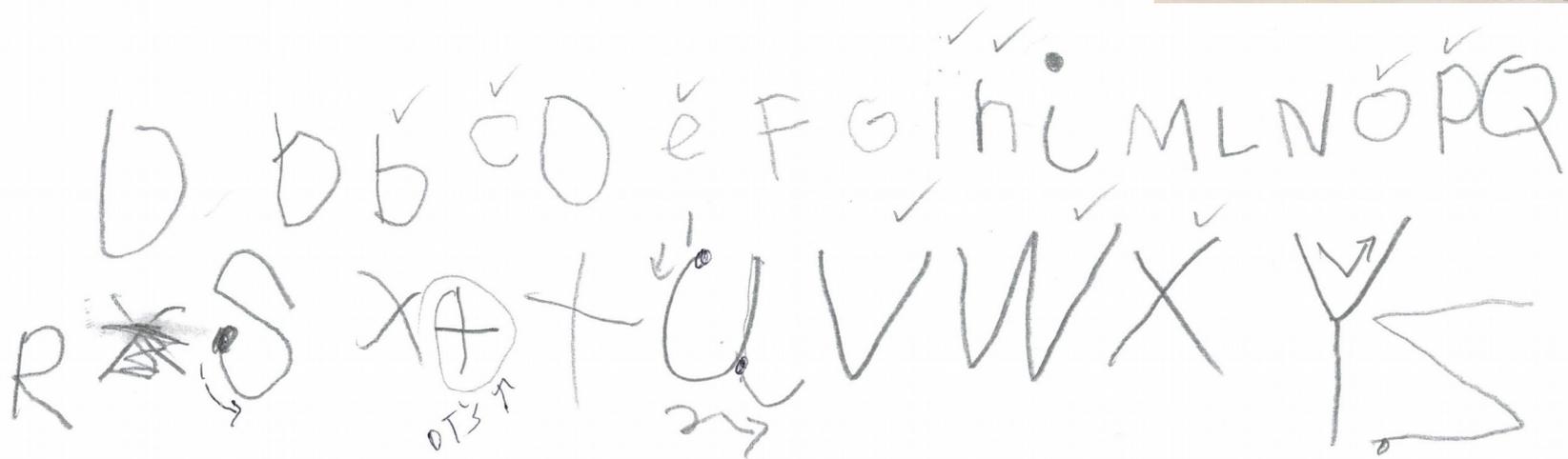
This speed is usually achieved by second grade.



Case Study 7 year old boy in 1st Grade

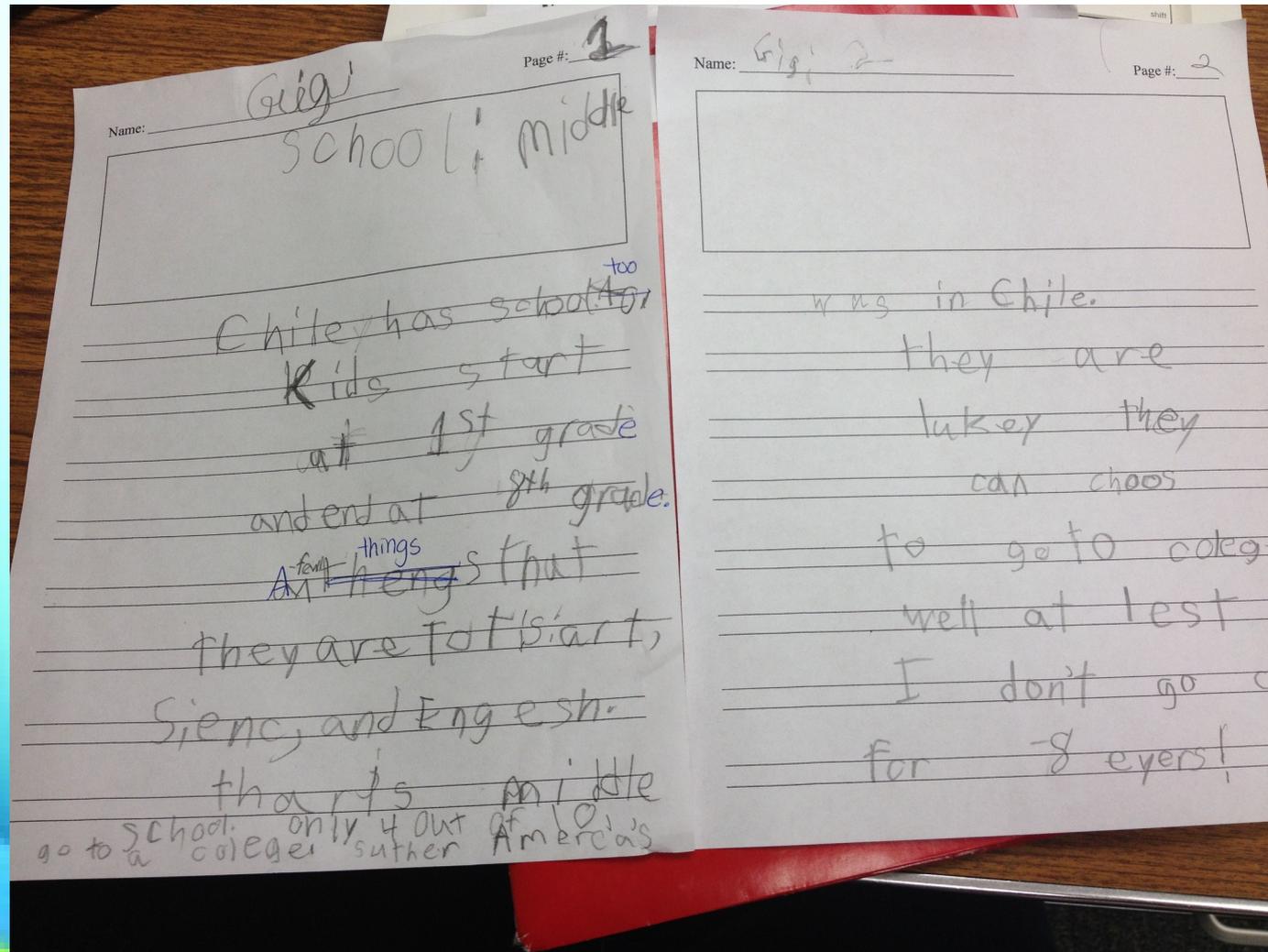
Note the very writing slow speed

Signs of difficulties with spelling



8:35

Case study - 7 year old girl



What do you see wrong here?

The Life of...



Name: 6/1

Date: 2015

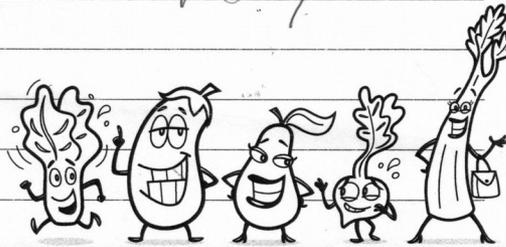
What's your favorite fruit or vegetable? Imagine what it would be like to live a day in the life of your fruit or veggie. Write a short story, poem, or song about it.

Questions to think about and get you started:

1. Where does it live? Where does it grow? What it would do each day?
2. What it would see, hear, and feel? Where would it want to go?
3. What would it want to be when it grows up?

Potato

Potato BASKET (my favorite fruit or veggie) it walk again in a band
 w len it would write, be a
 dakt potato salad
 world saw Barack
 POTATO, Grapes, Eggplant,
 celery, Pars, and peas
 potato chips and
 run a way



abcdefghijklmnopqrstuvwxyz



59"

14/26 correct

p

She had midline crossing difficulties both
In the horizontal and vertical planes when she
wrote.

This was also seen in her motor movements &
visual tracking.

Her Treatment

Practice crossing the vertical and horizontal planes of her body

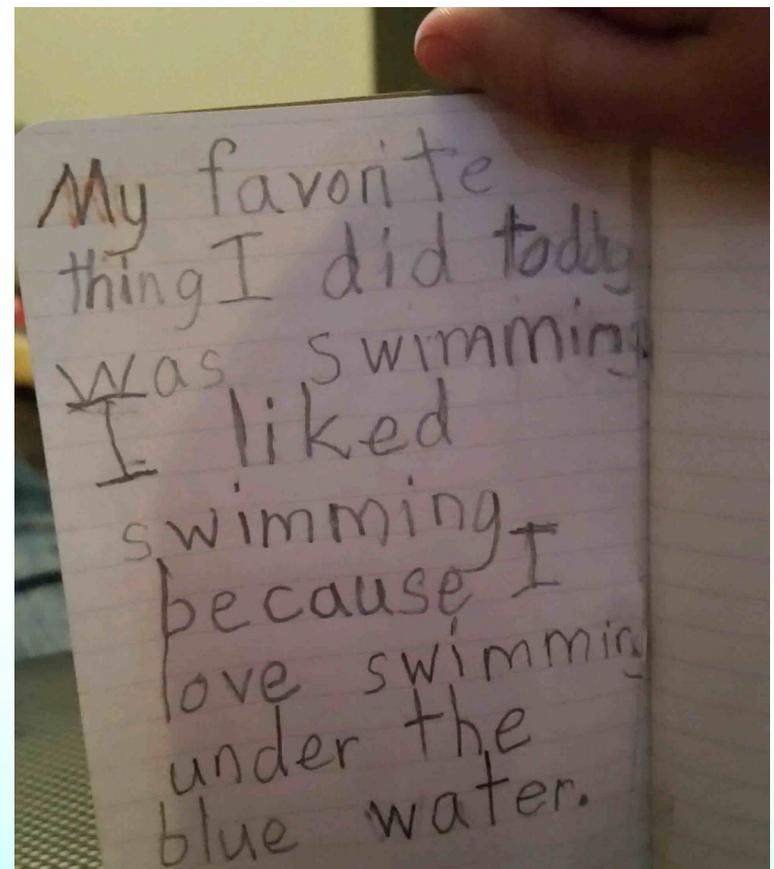
The crossover pencil grip for writing

Relearning letter formations

Fine motor activities – tongs

Marking an “X” on her thumb

Working on visual tracking

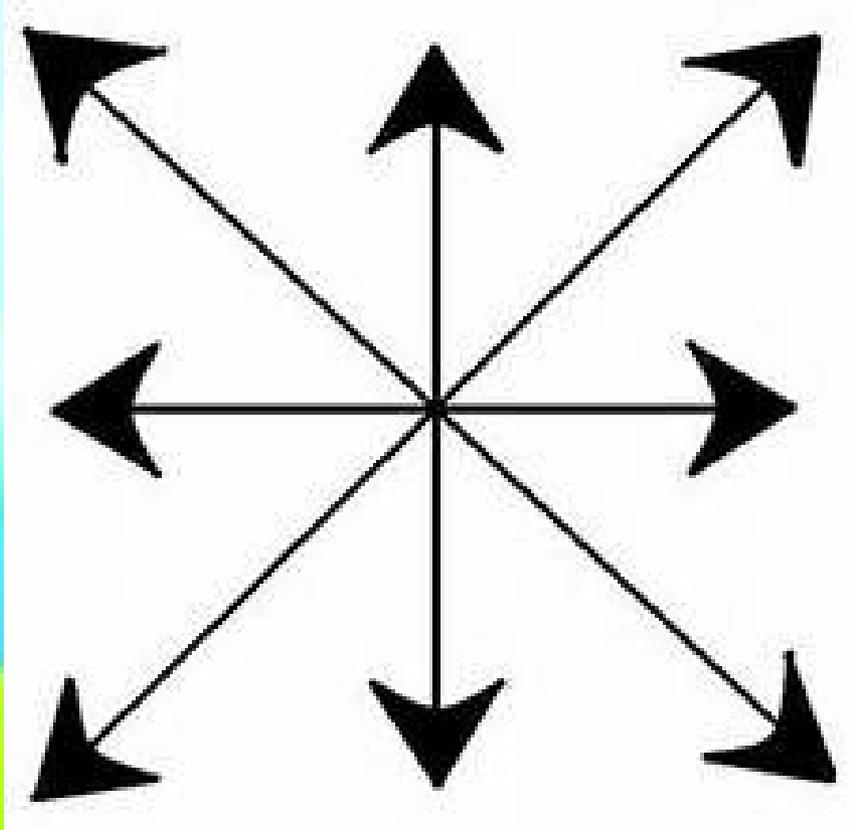


Physical Indications of Integration/Vestibular Difficulties

- slumped posture
- not crossing midline and/ or trunk rotational difficulties
- reflexes not integrated
- copying difficulties
- can't do “superman position” or prone extension
- Losing place in reading (tracking difficulties)



Practice testing visual tracking.



Visual Accommodations

- Encourage the child to use his or her finger to follow the text
- Use a book mark to help the child keep his or her eyes on a single line
- If possible, use larger fonts
- Use a slant board (or large notebook turned sideways) to lean books against
- Give preferential seating, so the child can see the board easier

Possible Treatment Ideas

- Allow the child to spin in play! Challenge the child to try to stand as still as a statue, until he or she is no longer dizzy.
- *Brain Gym-EduK Techniques* , Paul E. Dennison & Gail E. Dennison
- *Infinity Walk* from “The Complete Infinity Walk, The Physical Self” Deborah Sunbeck, Ph.D.
- *Bal-A-Vis-X*, by Bill Hubert
- *Juggling*, a book by Clive Gifford
- “*Activities to Enhance Crossing of the Horizontal Midline*” by Carrie Lippincott, OTR/L
- Referral to a pediatric occupational therapist, knowledgeable in sensory integration

Focus on helping children learn how to write the lowercase letters first.

Capitals are only used in writing 2% of the time.

Teach letters grouped according to their starting stroke.

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

l f h k b
c a d g qu o
i j n w or w r s
y or y t p or p
m n v x y

When teaching cursive, start with having the child practice a series of c's on butcher paper taped to the wall. Use smooth gliding crayons.

Do not move onto learning any other letters until this letter is mastered (the child can do a series of the letter consistently with his or her eyes closed).



Start having the child practice short words as soon as they have mastered a few letters, such as “dad, add, cat, gad, etc

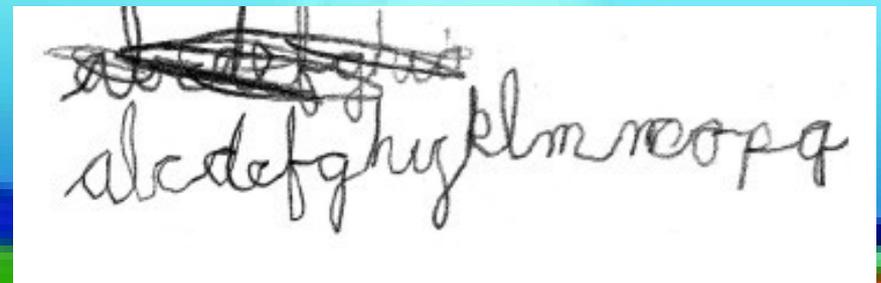
Remind the child to focus on writing the letters with good formation.

Once the child has learned how to form all the letters, practice writing the alphabet.

Start with writing the alphabet in the air with a plastic sword.

Then write the alphabet on a plain piece of paper and time it.

If writing the whole alphabet is too stressful, start with a few letters in the beginning and slowly add more letters as they are mastered.

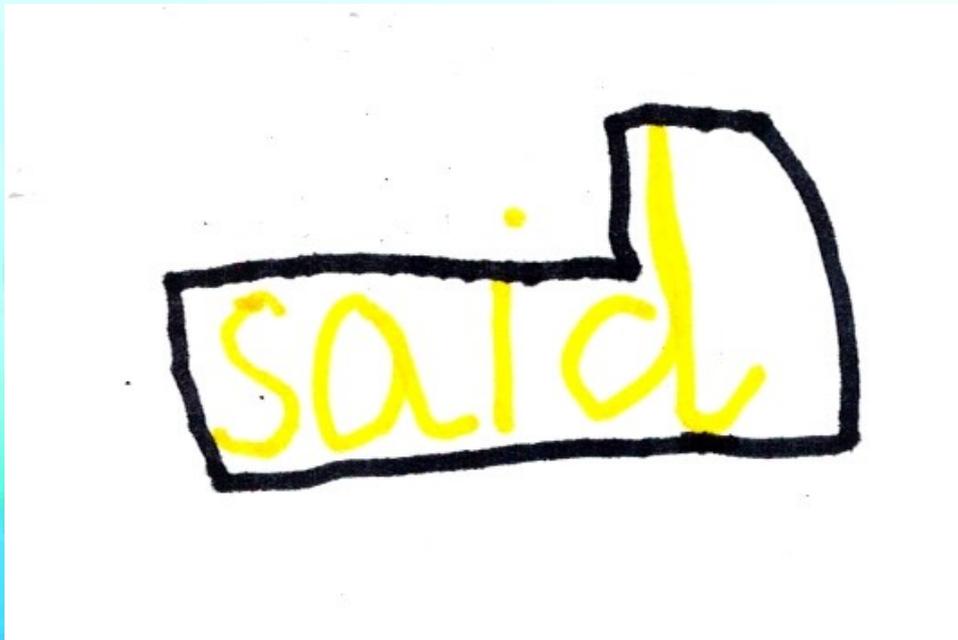


Pairing Writing With Spelling Practice

Also, when a child has mastered how their letters, consider practicing writing words from the 100 most frequently written words list.

The first 100 words make up 50% of all written material.

The top 300 words make up 65% of all written material.



25th
most frequently written word.

Written by Miles, a 10 year old,
with Dysgraphia

Materials I use: therapy ball, recipe cards, triangular shaped markers

Handout available at Make the Grade OT

Accommodations

Until the child has mastered writing the lowercase alphabet from memory, minimize the amount of writing requested from them.

Enlist the child's parents for help in improving his or her fine motor skills.

Use a pencil grip to support an open web space or “O” shape in the hand on the pencil.

Change the grip or pencil, as a child's fine motor skills improve.

Name _____

Sentence Stretching

If I found a bottle washed up on the beach with a note in it

I would (first) ~~I would read it~~
~~it and I would read it~~
~~it and I would read it~~
~~it and I would read it~~
 (tell what, where, when, why or how)

I would (second) ~~and I would read it~~
~~it and I would read it~~
~~it and I would read it~~
~~it and I would read it~~
 (tell what, where, when, why or how)

and eat dinner and
 try to get I no why
 23



Do not depend on computers to replace a child's handwriting

There is always forms to fill out and notes to write throughout life.

Carrie _____

We hope to see you real soon
 as im doing most
 of my work in cursive
 Ryan

Computers can become a child's primary method of written communication, however the student will need careful instruction in keyboarding.

The same processing issues that hinder progress in handwriting will still be impacting the child's writing on a computer. - Berninger

See the handout for ideas of specific programs to try.

February 24, 1967

5555

510570

55

57580

5205

5

590

530

5

5100

5

540

5105

5

550

510

570560

510

560

510

Please don't chastise!

Children are often doing the best they can.

Let children use lined paper.

It is not too late



It is still is possible to
turn things around for
older children!

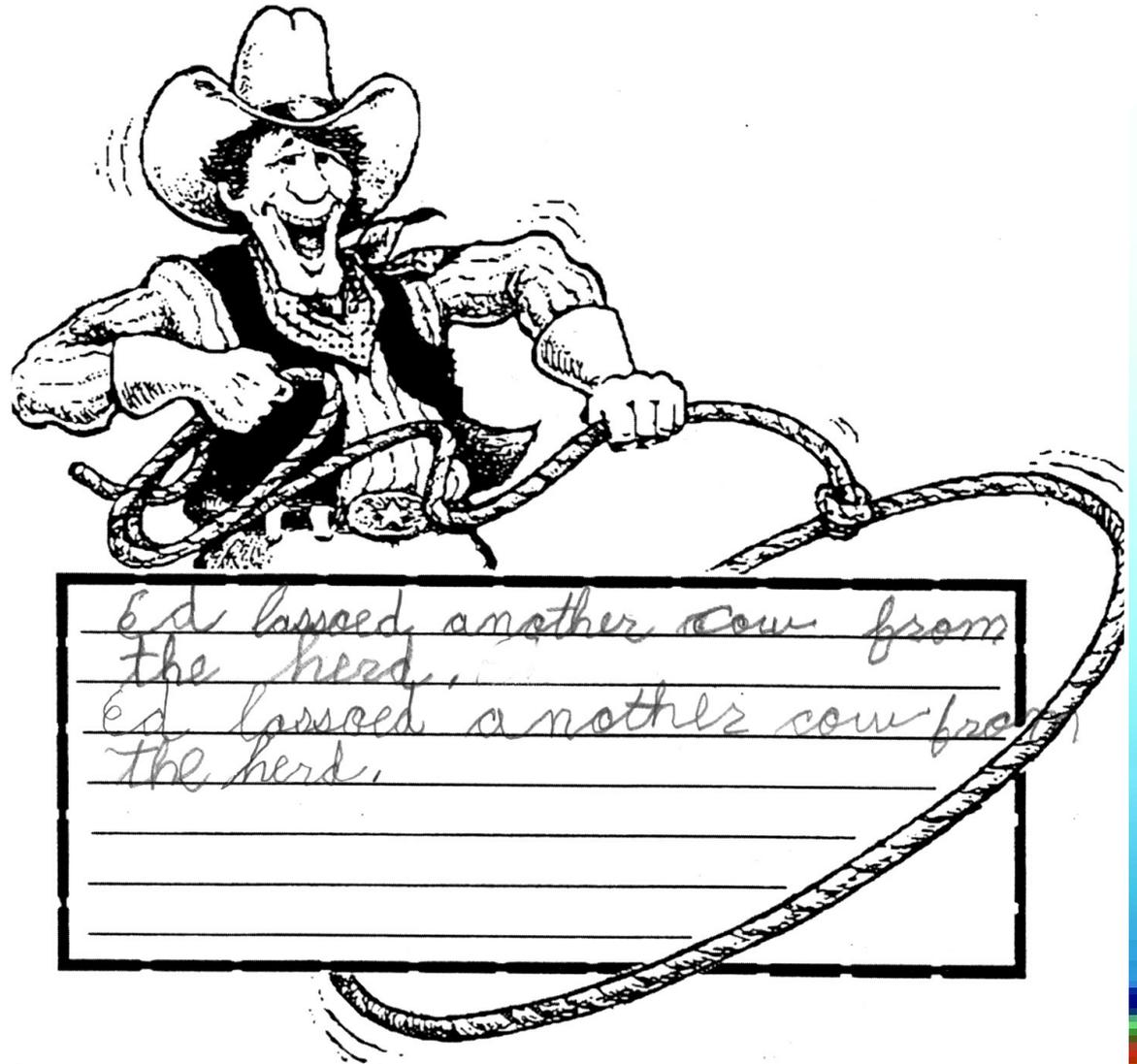
this is my best
and serious sample

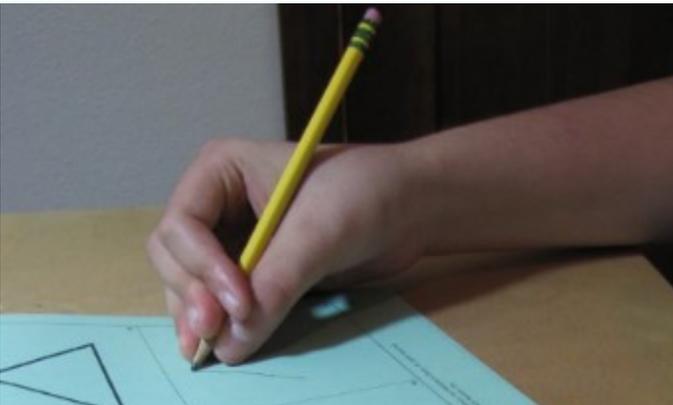
April 29, 2016
12 years, 9 months

this is my slow and careful
writing *

December 6, 2016
13 years, 4 months

7 months later or
19 treatment sessions





April 29, 2016

Handwritten cursive text: "abcdefghijklmnopqrstuvwxyz" with "18/26 correct" written below it and the number "41" written below that.

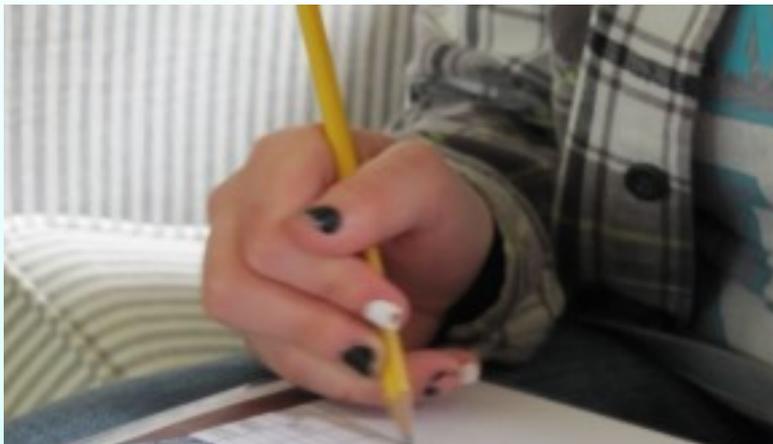


December 6, 2016

7 months later or with 19 treatment sessions

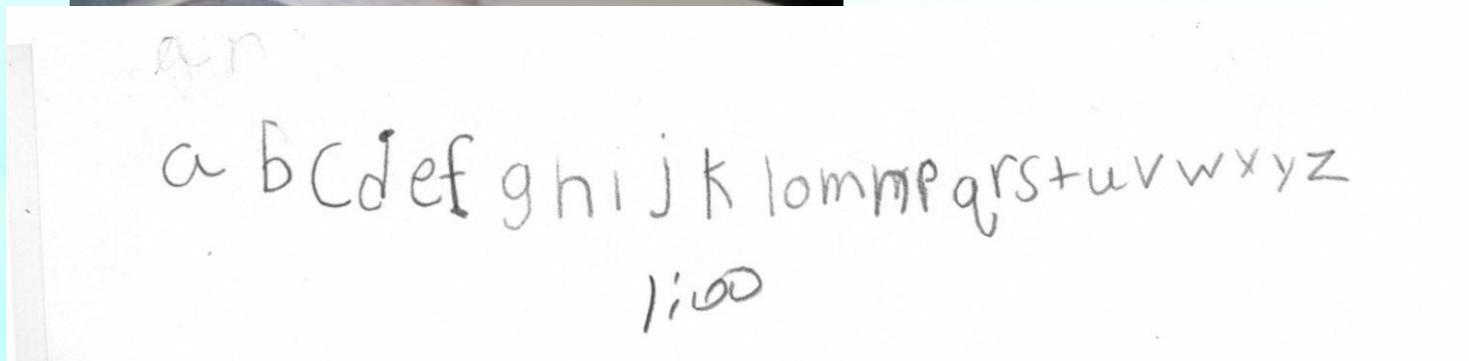
Handwritten cursive text: "abcdefghijklmnopqrstuvwxyz" written in a more fluid and consistent style than the previous sample.

42

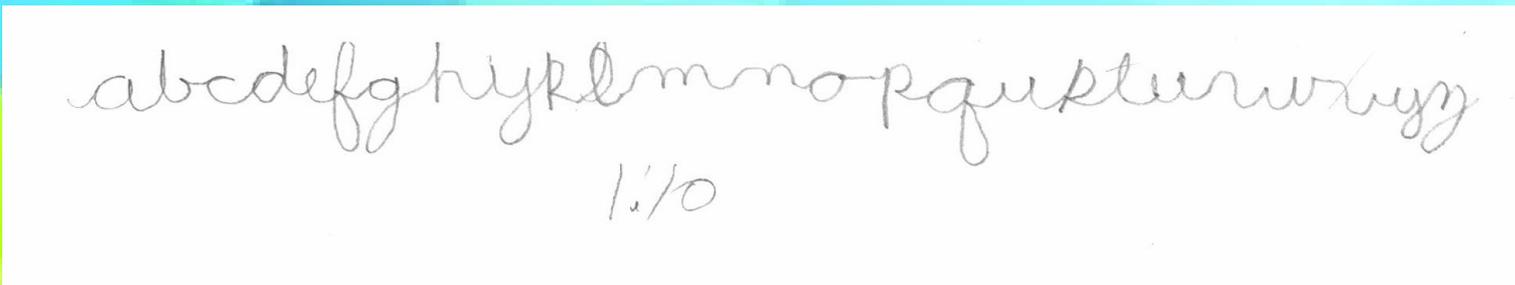


April 27, 2016
13 years, 7 months

She presented with handwriting difficulties,
muscle cramping and pain



November 11, 2016
14 years, 1 month



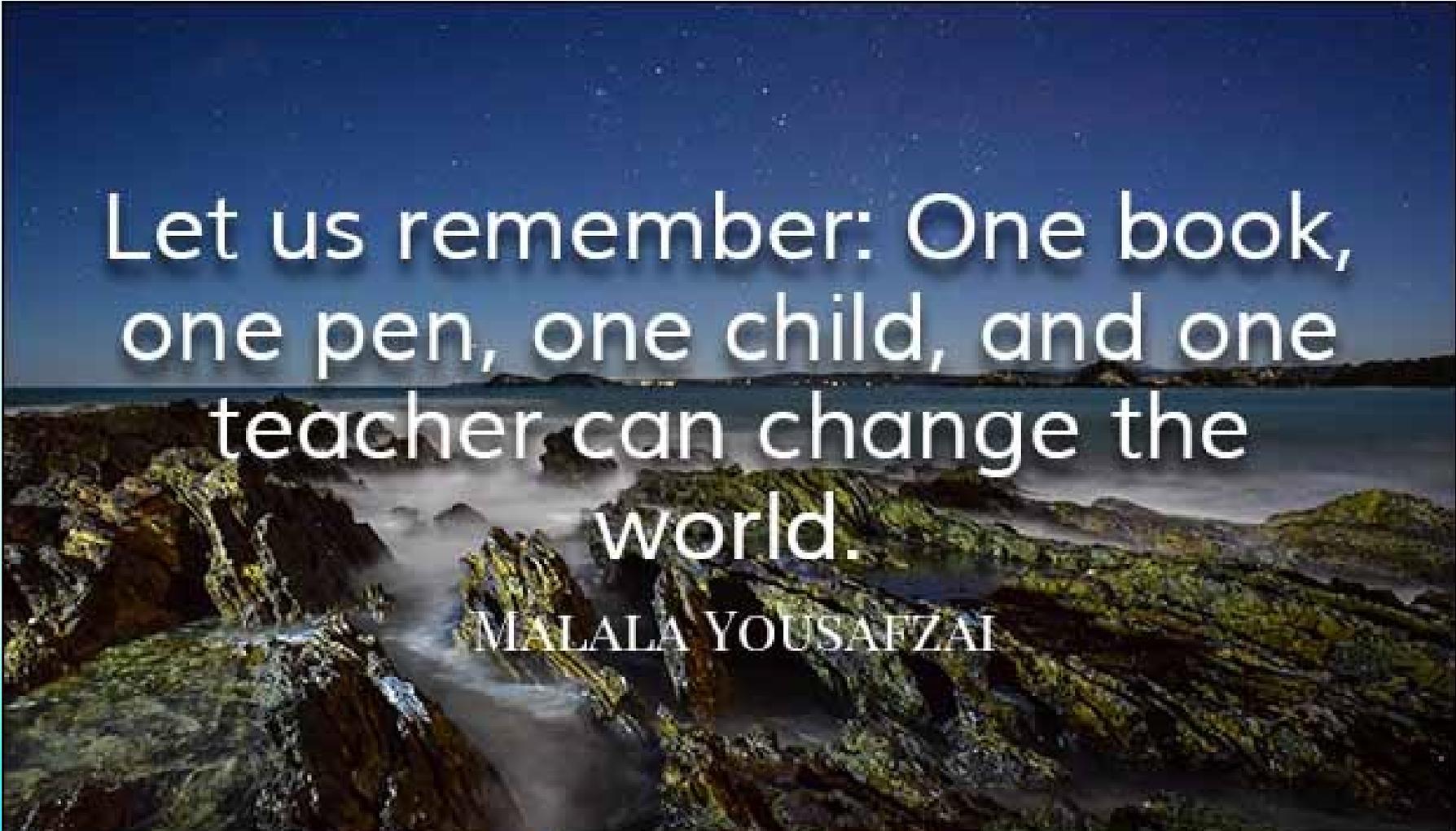
I eat pizza because it is good. 55'

I eat pizza because it is good. 36'

I eat pizza because it is good. 34'

I eat pizza because it is good. 36'

Working on speed
November 10, 2016



Let us remember: One book,
one pen, one child, and one
teacher can change the
world.

MALALA YOUSAFZAI

 BrainyQuote®