

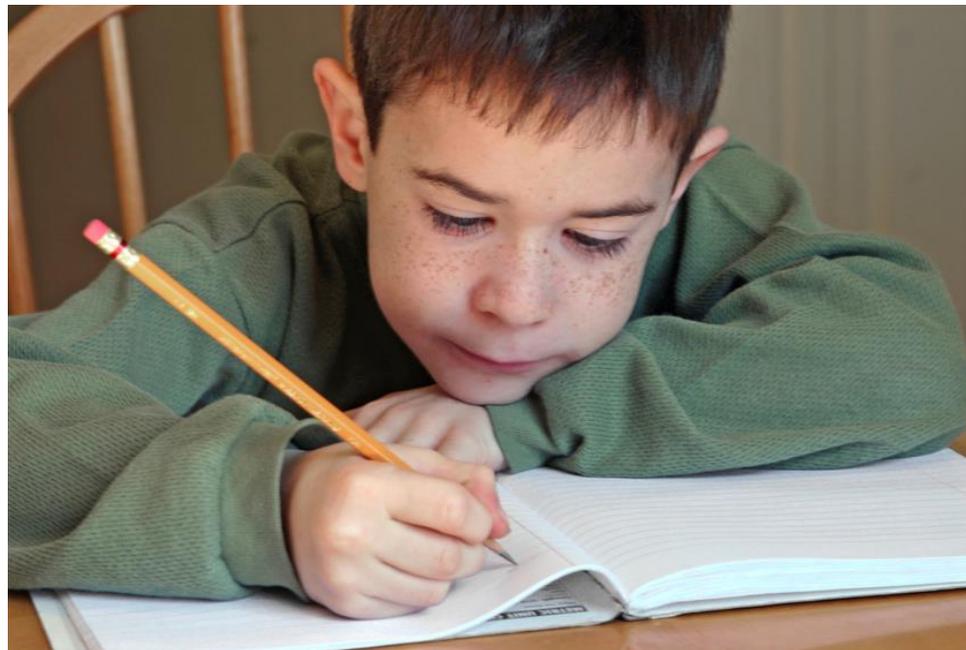
DYSGRAPHIA

Hidden
Handwriting
Disabilities



Content of This Unit

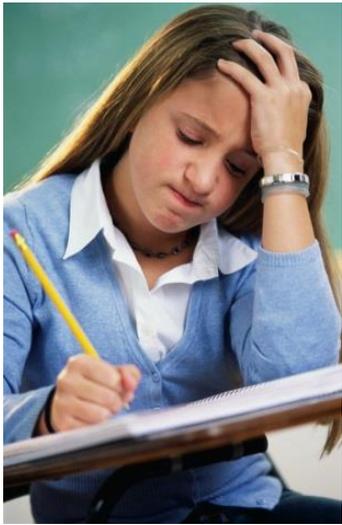
*What is Dysgraphia?	Page 2
*Types of Dysgraphia.....	Page 7
*Diagnosis and Treatment.....	Page 13
*Simple Classroom Solutions.....	Page 14
*Accommodations for True Dysgraphia.....	Page 22
*Interventions	Page 30
*Other Forms of Technology	Page 37
*Resources	Page 39



What is Dysgraphia?

Dysgraphia is a processing disorder that impacts a student's ability to put thoughts into writing. Even though it causes great difficulty for many students, it remains relatively unknown.

Here are some signs of dysgraphia:



1. Sloppy and/or illegible handwriting
2. **Fast** or **slow** speed of writing with poor results
3. Changing from print to cursive, and back again
4. Letters poorly formed or showing incorrect sequence of strokes
5. Unusual pencil grip (may also include strange body positions)
6. Inability to show learned skills on paper (including poor spelling and grammar)
7. Speaking to self when writing and/or watches own hand while writing
8. Writing includes unfinished words or sentences
9. Complaints or observations of hand fatigue or pain
10. Avoidance of writing and/or fine motor tasks

It is important to realize that many students with dysgraphia have no problem with other fine motor tasks such as buttoning, cutting, drawing, coloring, video games, etc. Often, the only fine motor ability that is hindered is actual writing. This is because writing involves a specialized portion of the brain and is essentially separate from other fine motor tasks in many ways. This, of course, creates problems because teachers and parents may assume that the messy and inaccurate writing is due to causes within the student's control (i.e. slow down speed, take more care, etc.). They often find it hard to imagine how someone who can color, button, or cut so well could have a fine motor problem of any type.

One of the simplest ways to determine whether a child should be screened for dysgraphia, beyond noting the 10 “signs” already provided, is to examine the student’s grip. In the following pictures you can see three different vantage points showing a mature “adult” pencil grasp (good grasp):



Notice how the index (pointer finger) is on top and the other three fingers stabilize the point of the writing tool against the paper. Also, see how the pressure on the pencil is centered over the upper part of the finger and that the finger is not strained, but lies at a natural angle.

Now, look at the pictures on the next page, and see the following problems in these unusual grips:

1. index curved in and writing supported by middle finger
2. same as #1 but with unusual pressure position of middle finger
3. index and middle on top with unusual pressure position of both fingers
4. index and middle on top with normal pressure positions
5. first three fingers curved over pencil
6. all four fingers curved over pencil in palm type of grasp
7. (picture on cover of document) modified palmar grasp with pencil resting on pinkie finger

1



2



3



Examples of unusual handgrips

4



5



6



These seven problems are by no means the only unusual grips you will see, there are many more, but they will give you an idea of some of the problems you may see.

So, what causes dysgraphia? In many ways we are still in the dark as to how these conditions emerge. We do know that many of these children do not have the ability to use their fingers or finger tips to produce clear letter formation. That is why you will see that many of the students with dysgraphia twist their hands and fingers to bring the writing motion *back into the center of the hand and/or wrist*.

This attempt to move control back into the hand or wrist is important to note! Many times teachers and parents will attempt to use some type of pencil grip to obtain a more accurate and mature grasp, and this is totally fine if the child's inability to use this grasp pattern is merely *developmental*. In these cases, the grip just gently moves and positions the fingers so a more mature grasp can be achieved, a change that most children tolerate well. The child has the *neurological ability* to eventually develop the correct grasp pattern and can be guided to do so.



If the problem is due to dysgraphia, though, the use of one of these grips will often make the situation worse because it moves the pressure and control forward *to the fingertips*, something these children cannot neurologically manage.

So, it is important to understand that sometimes the inappropriate grasp is not the **CAUSE** of the poor handwriting, it is the **symptom of an underlying condition** (i.e. dysgraphia). Changing the grip in those cases will not give you improvement, only frustration...

We can get an idea of exactly which neurological issue is causing the most difficulty for a student by looking at the three different forms of dysgraphia. We will take up that topic next.

Types of Dysgraphia

There are three different forms of dysgraphia. Here are the most common descriptions (though you will see some variation in the field) and what you can expect to see:

Form of Dysgraphia	Source of Problem	Ability to Write Spontaneous Material	Ability to Copy Material	Ability to Spell	Other Fine Motor
Dyslexic Dysgraphia	Neurological Processing Disruption	Poor	OK	Poor	OK
Motor Dysgraphia	Motor Processing Disruption	Poor	Poor	OK	Poor
Spatial Dysgraphia	Visual-Spatial Processing Disruption	Poor	OK	OK	Varies

PLEASE NOTE: *The intention of this unit is to give you enough information to note possible problems and assist families in obtaining the proper medical diagnosis through a qualified professional. It is not meant to be used by educators to diagnose the student within the classroom. I KNOW you know this, but it is best to mention it directly 😊*

As you can see, **Dyslexic Dysgraphia** is a true neurological processing disorder. The student cannot “think” and write at the same time. This can lead to great discrepancies between what a student knows (and can say verbally) and what they can write on paper. Definitely a problem in school! In some cases you can actually see the processing problem in action.

For example, many older students with Dyslexic Dysgraphia will start out an exam by reading a question and thinking about what they want to write. Because writing and thinking are separated at this point, they begin by writing cursive. It is messy, but they can manage it to a degree. Then, as they come to the end of that initial thought and have to *begin thinking while writing*, their cursive become poorer and poorer and most will convert over unconsciously to print in order to manage the writing/motor task. Finally, even printing is too much for the brain to handle, so they lose their train of thought and have to stop, reread the question, and reread what they have written so far. Then, equipped with a new idea, they start to write again. But, because the writing and thinking were separated for a moment, they write in cursive again.

This is the pattern you will often see with this group, if they are old enough to write cursive. When the writing task is intensive, *they will begin in cursive, switch to print when writing and thinking are simultaneous, and then switch back to cursive after a thinking pause*. The use of cursive drops in and out depending on the cognitive demands at a particular time.



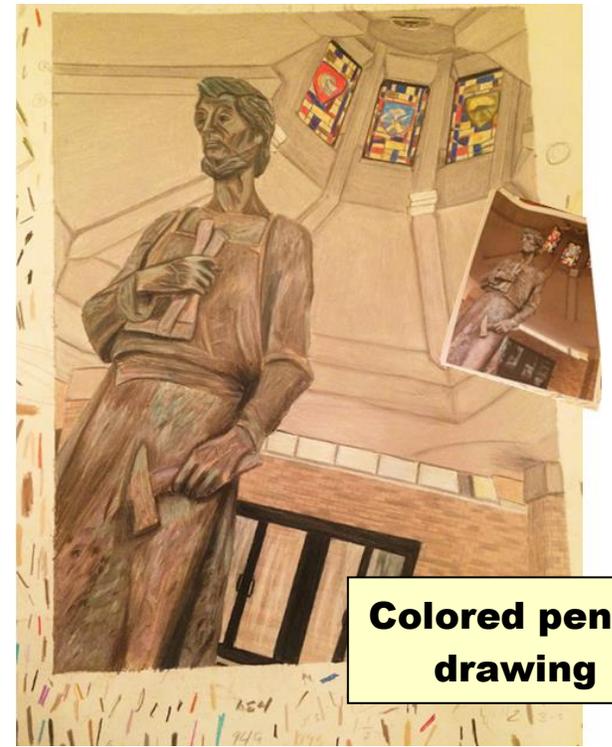
Another interesting observation is the fact that many children with the dyslexic form of dysgraphia are competent in other fine motor skills. In fact, these skills may be quite good, even for other closely related tasks like drawing with a pencil or pen! To gain an idea of how different these fine motor can be from dysgraphia, here is my own daughter’s drawing (yes, I live this at home 😊). It was her grip and writing you saw on the cover of this manual so take another look to remind yourself.....then look at her art!



Self-portrait print lifted from carved Styrofoam



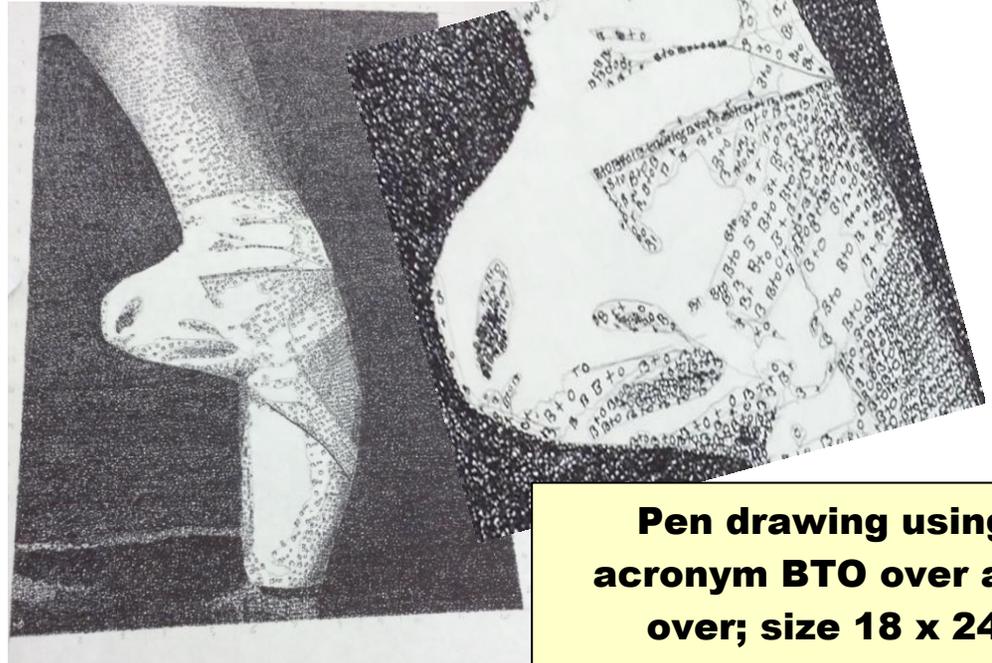
Mosaic made from cut magazine pictures



Colored pencil drawing

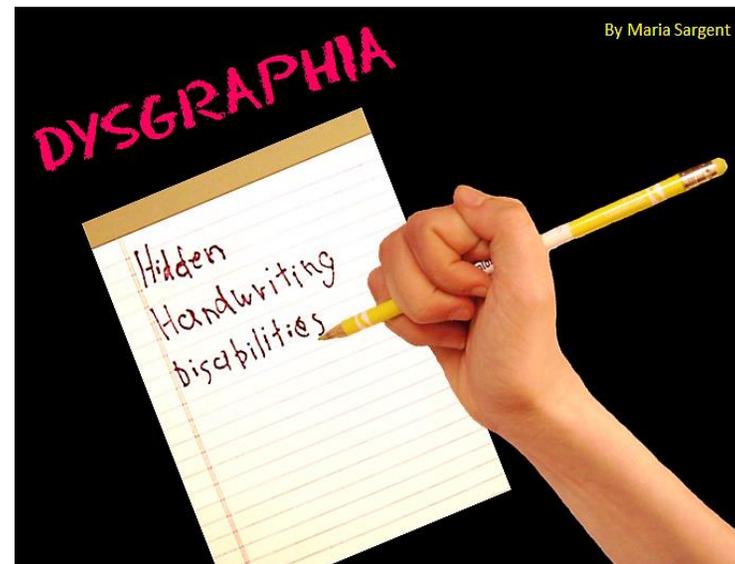


First attempt at painting portraits



Pen drawing using acronym BTO over and over; size 18 x 24

So, how do you go from this writing with a pencil...



By Maria Sargent

...to this drawing with a pencil?



As both a mother and a professional, I would love to say I knew myself, but the fact remains it is not only possible, I see it often in my practice. You can begin to understand, though, why this condition remains so hidden. Who would believe that there could be such a discrepancy? Definitely something to keep in the back of your mind as you move forward with assisting these students.



Another item to note is the fact that children who have the Dyslexic form of Dysgraphia usually have poor spelling-----let's make that very, very, **VERY** poor spelling! Even simple three letter words will often be a struggle, and this problem is not remediated by extra study. The only way to assist the student is to use alternative forms of retrieval, a topic we will examine in the intervention section.

The last issue to mention is the difference between spontaneous work and copying. When the child is completing spontaneous work, they obviously have to think at the same time, and their writing ability deteriorates in response. When a child copies, though, the thinking has "already been done" so the brain can

focus on writing a bit more....and magically you get a better result!

This difference can produce some difficult situations, though. I have seen many students with Dyslexic Dysgraphia chastised for sloppy work and made to do it over. When the teacher gets that copy, and it looks a bit better, they assume it was because the child slowed down and was more careful (*remember some children with dysgraphia write fast. This is because they can keep better control----almost like sliding scissors across wrapping paper and getting a better cut*). Unfortunately, with Dysgraphia, the speed or care has nothing to do with it. Since the child does not have to "think" while copying, the writing improves. The teachers don't realize this, though, and assume the poor product the child is producing can be controlled and act/grade accordingly. So, yes, please note that while some children DO just need to slow down (not all examples of sloppy writing indicate Dysgraphia), we also need to be on the lookout for children who really have a neurological processing problem that requires much more assistance.

So, as you can see, Dyslexic Dysgraphia is a complicated and rather hidden condition. **Motor Dysgraphia**, on the other hand, is much easier to spot and treat because it usually crosses all aspects of fine motor ability. Spontaneous writing is poor, but so is copying because the issue is not with the cognitive part of processing; it is with the motor control. Since this motor problem is not impacted by thinking, spelling is fine, and grades are usually adequate. In addition, because other fine motor tasks like buttoning, zipping, coloring and cutting are also usually poor, this condition is difficult to miss. Most of the children with Motor Dysgraphia will be noticed and treated for a general fine motor delay.



The last form, **Visual-Spatial Dysgraphia** is also a bit easier to manage than the dyslexic form. Visual-Spatial Dysgraphia is an eye-hand coordination problem. So, rapid work like spontaneous writing WILL be more likely to be messy and poor. If the child slows down or copies, then the results will be better because the child has time to coordinate their eyes and hands more accurately. Because there is no true cognitive disruption, though, spelling is fine, and grades are usually good (or close to typical) as well.

The ability of children with the Visual-Spatial form of dysgraphia to manage other fine motor tasks depends on the speed and eye-hand demands of the item. If the child is working on something with high visual demands, (i.e. copying something from a board a distance away, etc.) you may see significant issues. This means you will see a great deal of variation in the work of these children. Some skills can be quite good and others quite poor, depending on the situation involved. Usually, though, there are enough problems that Visual-Spatial Dysgraphia is more likely to be noticed and treated, usually as a general eye-hand coordination problem.

Diagnosis & Treatment

While dysgraphia may be suspected by a teacher or parent, it will need to be diagnosed by a qualified professional. Depending on your location, this may be completed by a physician or a licensed psychologist who specializes in the diagnosis of learning disabilities. Typically other professionals such as an occupational therapist, school psychologist, and special education teachers may also be involved in both the testing and program development.



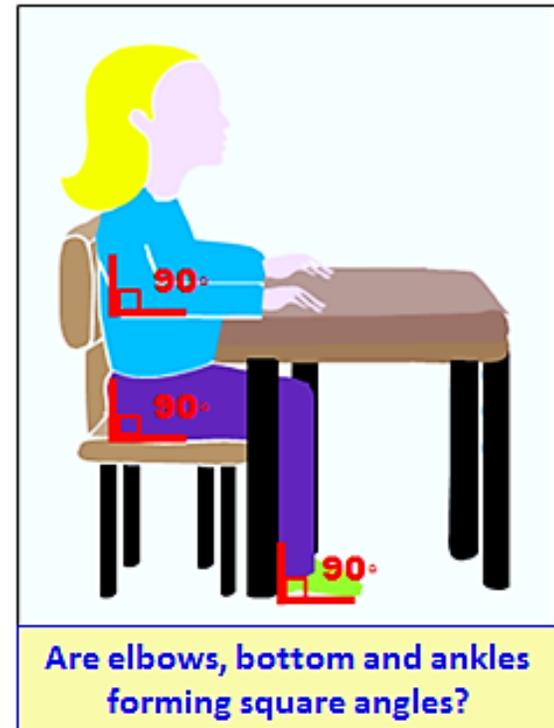
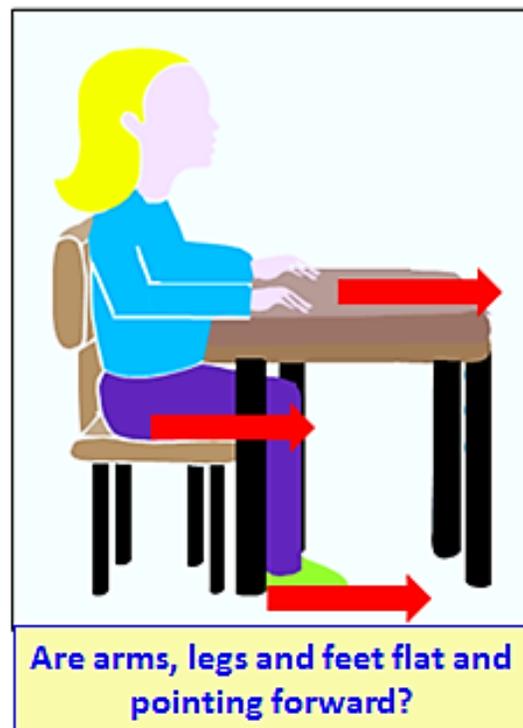
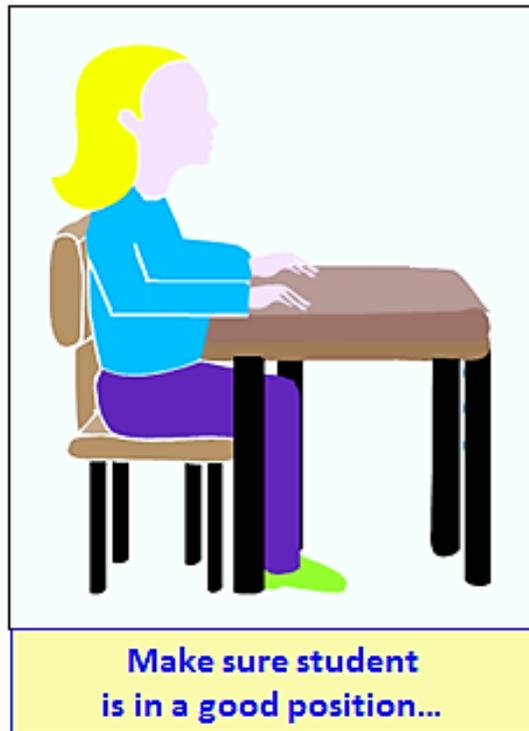
The assessment process is not as simple as looking at a sample of handwriting or a child's schoolwork. Testing also includes neurological aspects of the writing process such as finger-tapping speed, hand strength, wrist flexibility, tremor detection, position of pencil grip, body posture, handedness, and other related indicators such as fatigue and pain. Typically the assessment of dysgraphia takes a bit of time, and many students are not formally identified since the condition remains fairly unknown outside professional circles.

Once a student has been diagnosed with Dysgraphia, then additional treatment and accommodations come into play. While Dyslexic Dysgraphia does not respond as well to traditional fine motor therapies, that does not mean they should be skipped. Some improvement can usually be gained, even if the sole change comes in hand and finger strength. Students with the motoric or visual form of Dysgraphia often respond better and also will use motor therapies as part of their treatment. Since these formal therapies lie outside the realm of the typical classroom, though, I will focus the rest of this unit on what teachers can do in their own classrooms. So, yes, please follow any recommendations you receive from medical, special education, and therapeutic sources, but here are some other techniques for you to try as well.

Simple Classroom Solutions

The first approach for any teacher should be *prevention of habits* that can make the writing process more difficult over time. Once these habits are learned, they are difficult to remove. Here is a simple list of techniques that can help ALL students:

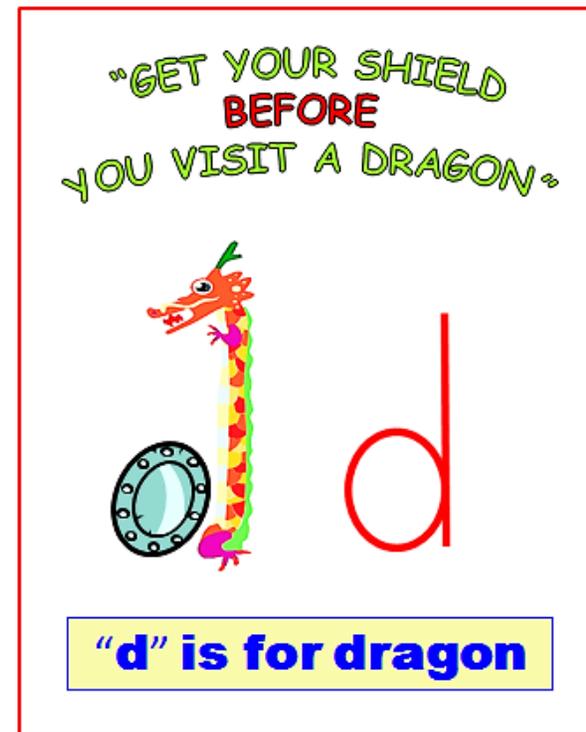
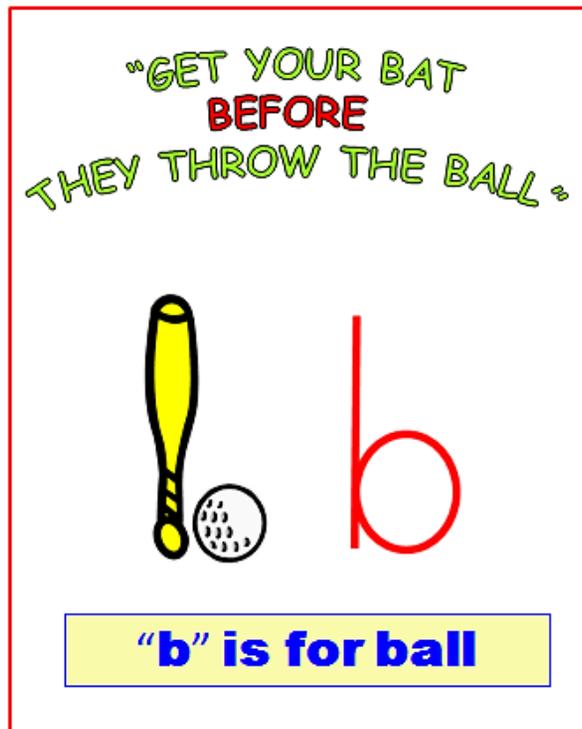
1. Proper Posture: Directly teach proper writing posture. Some children actually need you to put adhesive footprints on the floor and a dot on the back of their chair. If you can get that back against the chair and the feet flat on the floor, it is almost impossible to have everything else in the wrong position...almost, mind you 😊....still keep an eye out. Look for the following:



2. Teach correct letter formation through multiple avenues: Of course every teacher knows how to teach children to write, but we sometimes forget that children form memory through different avenues. Here is a quick reminder of the multitude of ways you can teach letter formation. Nicest of all, even if a child doesn't need additional help, they still enjoy learning in these "different" ways too!

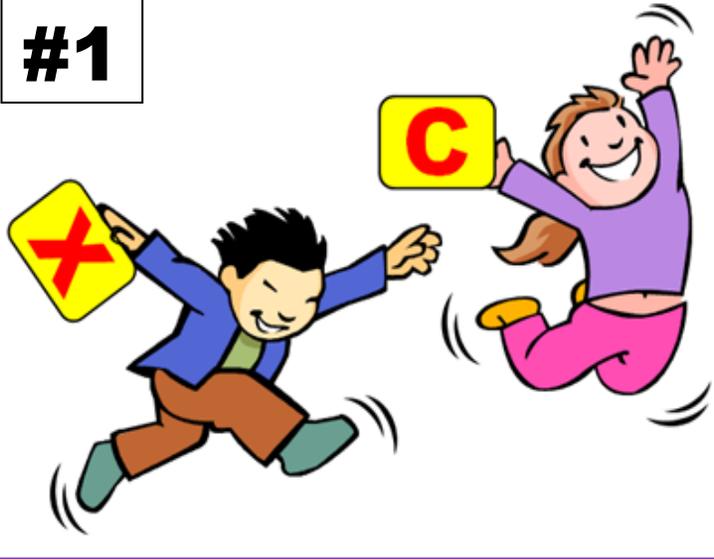
Visual Learners- These children use the typical writing curriculum. They can model basic strokes and will eventually internalize the sequence for each letter with practice.

Auditory Learners- These children use the typical writing curriculum but may focus more on the verbal sequence than the visual. This group may benefit for special cues in the form of a rhyme or chant to help them keep similar sequences separate (i.e. both "b" and "d" use a "stick" and "ball" formation). Just come up with novel and humorous ways to hold the concept in mind!



Kinesthetic Learners- This is a group that we often accidentally miss because we think a fine motor activity automatically reaches them. This is true for many of these children, but for some, the slight motions of the hand will not trigger the same memory-put-down as the handling of objects or gross motor activity would. This is a group that could benefit from activities such as the following:

#1



Create letter by moving total body
(gross motor and proprioceptive awareness of total letter form)

#2



Constructing letter with others
(gross motor and proprioceptive of letter-strokes)

#3



Constructing letter from natural objects
(more activation of muscles in hand)

Please note the two different gross motor activities. Some children have such a limited awareness of space and form that they must first be able to “visualize” the total letter with their bodies (#1) before they can figure out the “pieces” of that same letter (#2 and #3). So, play around with these three items. You will know best what your children need and can handle. For example, a child struggling with social skills may do much better with approach #3 than #2 since they can do it totally on their own. An over-excitable child may enjoy activity #1 but becomes so engrossed in the joy of movement that they really do not put down memory of the concept. You will know best what to choose for your students’ needs.

Sensory Learners- This is another group that we may not think about. This type of child needs to link a memory through a sensory input for the best response. I suggest starting with the drawing on an arm or palm so the child can internalize the letter form while you are drawing. Later, drawing it on their back and having them guess which letter is drawn is not only an enjoyable game; it forces the internal visualization that will really help them hold the stroke sequence in their minds.

NOTE: Draw the letter in reverse or position your body so the child “sees” the correct orientation in activity #1. However, when you draw the letter on the back (#2), use the sequence and orientation that looks correct to YOU. You would think you would have to reverse it, but that is not the case. This exercise can also be used for cursive and is a fantastic way to practice spelling words at any age!

#1

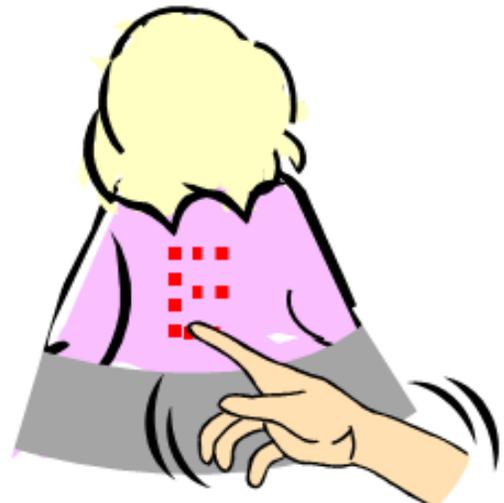


Have student watch while you draw the letter on their forearm or palm

#2



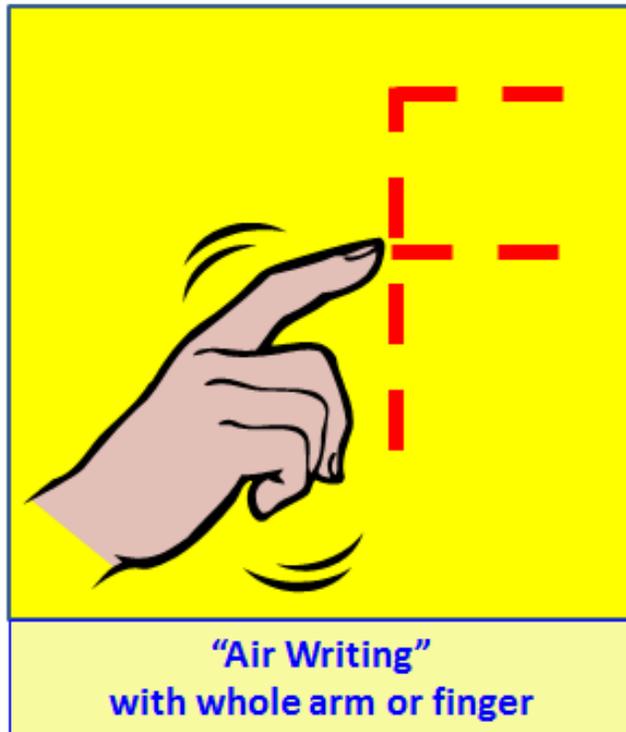
Have students close their eyes...



...while a teacher or student draws the letter on their back, palm or arm

3. Provide “non-writing” opportunities to write: Did you read that right? LOL---yes, you did!

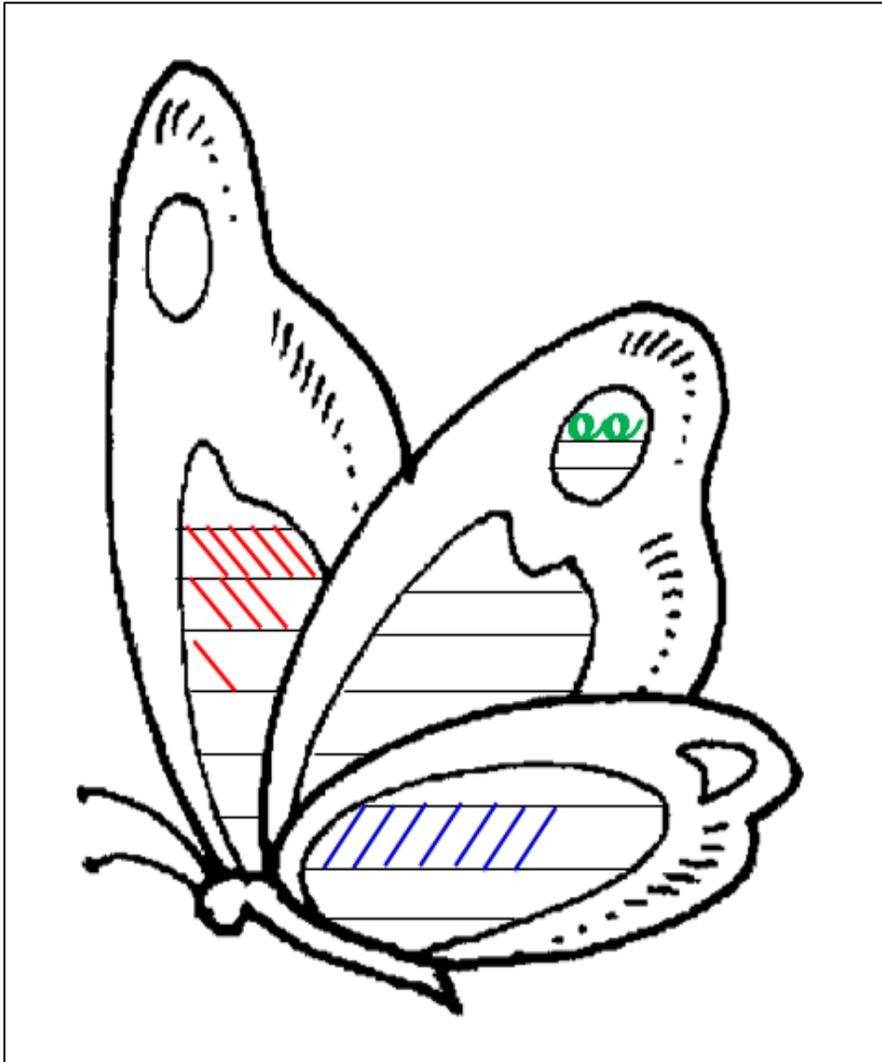
There are many ways you can work “writing” practice into the day. Any time a student is sitting in circle or at a desk, they can be writing letters or eventually words on the carpet, desktop or on their hand while a peer is answering a question. This not only gives them extra practice in letter formation, it also superimposes a “parallel” tone (i.e. everyone is doing the same thing at the same time) on what is typically an associative-level group activity (i.e., someone is responding and others are just listening). See the manual titled, *Groupness*, for more concerning this topic.



An additional form of practice that is really gaining a great deal of attention is something called “air writing”. In this technique, a student uses their whole arm or just their hand to “write” the letters or words in the air. This not only helps the student visualize the information they are writing, it can also keep wiggly children engaged in an associative level group situation. We will come back to air writing as an intervention later----it can be a wonderful way to assist children with full-blown Dysgraphia!

Beyond that, the only limit to the usage of this approach is your creativity. I will often have very young children who do not know letters yet draw me “pictures” in the air. Again, it keeps them engaged, gives them practice using their muscles, and forces them to respond to questions that they would not necessarily feel comfortable answering verbally. This approach can be even be used in read-aloud story times. I just have the children draw pictures of “what they think is going to happen next” or, if developmentally ready, answers to simple questions like, “Do you think the rabbit is going to find something to eat? Write yes or no!” A lovely way to keep all of them with you...

4. Make handwriting stroke practice interesting: many children begin to dislike handwriting right from the start. We often overuse worksheets that have strokes and letters but little else of interest. Do a couple of these and you would probably dislike handwriting too!



Consider having children right letters in sand, foam, and other sensory material. Often, just the use of a whiteboard can help a great deal---for some reason children just love to write and erase on those things 😊

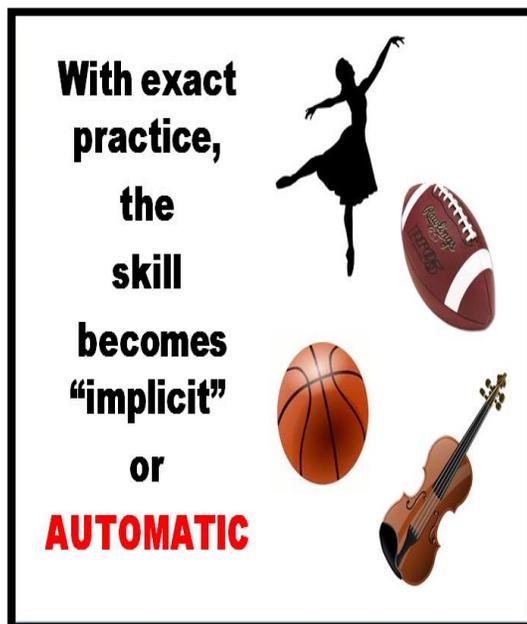
Lastly, I have found that if I add stroke practice to a coloring sheet and give the students colored pencils or markers, they will sit there and make the strokes forever! You can either use a key that suggests strokes for each color or just give them some example for each section and let them take it from there. I have also had great success in having the students make sheets for each other----how they love to trade them....

In other words, think about how we can get this skill into memory. We DO need this drill---ask any football coach or dance teacher, and they will tell you that drill is needed to get a skill into memory so the brain is freed up to think. Well, writing is no different. But, we do have to think a bit more about how to make writing practice interesting. I am sure you can come up with tons of ideas that will work!

Now, before we move on to true interventions, a serious side note... I am often asked about the fact that many schools are not directly teaching cursive writing skills any longer and questioned about whether I am in favor of this change. My answer is a resounding “NO”.

Cursive writing is a higher form of production that frees the mind from many “useless” and disrupting changes in motion (i.e. when you print, you have to move the pencil by picking it up and moving it to new locations on the paper repeatedly). So, yes, print is a lower neurological sequence since it is straight and circular lines in different variations, but it also demands a bit more of the mind, leaving less room for cognitive work like memory retrieval and creativity. *Print will be easier for the child with true dysgraphia or motor issues, but it comes at the expense of speed and flow, which is why cursive was(is) predominately used in the adult world.*

So, how did this “no-cursive-taught-in-this-school” theme emerge? Well, I think some of it came about when teachers realized that struggling children did better when printing. In other words, they caught dysgraphia cases accidentally, still often not knowing what they were doing, mind you, but at least they were helping. So, that is probably one reason for the “print” preference.



Another reason is the “we-don’t-like-drill” theme, but this removal of drill was an extreme fix for a rather simple problem. I find it amusing (and a bit sad) when I see schools insist that “drill” is inappropriate and then see their band drilling music.... football team drilling plays.... cheerleaders drilling chants and stunts...and on, and on, and on. It would be funny if it wasn’t so distressing!

No, drill is NOT bad, only *boring* drill should be avoided, but we already discussed ways to manage that problem. The key is understanding what the purpose of drill is—*it is to move a task to memory so it becomes automatic in*

nature. This frees up the brain to think during that motor task (i.e. to adjust football plays that are going wrong; to use expression while playing music, etc---and to think while writing!). In other words, drill is the key to creativity and active thought during what is basically a rote task. This is why learning to drive is fraught with danger until it becomes automatic. The new driver is so involved in remembering (albeit subconsciously) “how” to drive that it is very easy for the brain to miss many other things like other cars that pose a danger, etc. This same situation can be applied to any other motor task. We can’t see it as clearly when that task is “writing a story”, but it remains true all the same. The more automatic we can make the writing task (and the quicker and easier that task is---i.e. cursive), the more the brain is freed up for other cognitive aspects of the task (i.e. memory, creativity, making connections, listening to the speaker while taking notes, etc.).

So, definitely do not take this as an absolute “the student must use cursive” message. There are many children who will do better with print, and they should be permitted to use it. There are also many linked forms of print (i.e. D'Nealian Handwriting/Modern, etc.) that muddy the cognitive issue just enough that for many children it is a toss-up as to what should be used, but regardless, there is still a place and need for this in our curriculum. I am also concerned about the belief that learning should never require effort, “not being fun”, or always avoid the use of drill. We are not doing our students any favors when we imply these things---just think about how college or jobs interface with that message! Sometimes a task may not be our favorite, but there is often a purpose behind its use.

In short, make drill-like tasks (i.e. learning writing strokes, memorizing spelling words, learning math facts, etc.) as fun as possible...and then help the students to learn to tolerate things that aren’t their preferred activities and to see the ultimate purpose behind them. They will be more successful given these lessons.

Develop “implicit” level memories for skills that require later expression and problem solving

The graphic contains three distinct panels. On the left is a yellow rectangular box with a black border containing the multiplication problem $3 \times 4 = \underline{\quad}$. In the center is a handwriting sample on a blue-lined background, showing cursive lowercase letters 'a' through 'z' and numbers '1' through '0'. On the right is a colorful alphabet chart with letters A through Z arranged in five rows, each letter in a different color.

Accommodations for True Dysgraphia

While the general classroom solutions we just covered can also help students with Dysgraphia, you will usually have to go beyond that level to truly help these students. Unfortunately, there is no single way to assist this group, you just have to try a multitude of “tricks” and see what sticks. So, that is what this section will contain....a multitude of approaches that have worked over my 30+ years as a professional. I am sure that once you get the sense of how to approach writing intervention, you will come up with many more! Let’s get started:

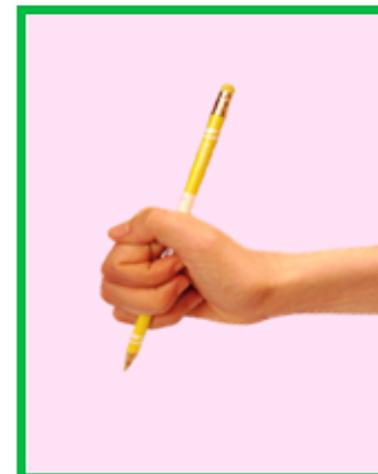
1. “Move” the writing process back into the hand, wrist, or arm: As I mentioned earlier, children with Dysgraphia may not have neurological control all the way through their fingertips. It is interesting to see what happens when YOU replicate these grips. Try the ones below and see where the movement originates from in the body. Once you experience it, you will fully understand this important concept!



**“Mature Adult”
grip gives
control all the
way through the
fingertips**



**“Immature Adult”
grip (2-3 fingers on top)
moves control
back into the
top of the fingers**



**Various forms of
“Palmar” grips
move control back
into the wrist**

As you can see, many children accidentally stumble on these strange grips and finger contortions and continue to use them because they seem to work better. They give the student the highest level of neurological control they can manage.

One of the biggest mistakes a well-meaning teacher can make is to force a child with true Dysgraphia into using one of the many pencil grips on the market. These grips can only be held using a perfect or near-perfect, mature-adult grasp. This forces the control into the fingertips, something these children cannot manage....or cannot manage without extreme fatigue, stress, or pain.



So, DO feel free to *try* these grips with all children, they may do the trick for students without Dysgraphia (and even some with the motoric or visual forms of true Dysgraphia), but for children who have the Dyslexic form, they rarely work and can do more damage than good. Just observe well, and you will be able to tell the difference.



Place the pencil between the first two fingers



...and then close hand over pencil at height comfortable to the student

So, if you shouldn't use grips, what should you use instead? Well, I have found that sometimes directly teaching a modified grip that moves the motion back into the wrist (but purposely and with control) can work wonders. In other cases, allowing the student to use the grip they have developed is the best you can do. I would definitely give the grip to the left a try, though. It really has been great for many of my students!

2. Directly teach the student to retrieve through another memory mode PRIOR to writing: One of the most unusual and frustrating aspects of Dyslexic Dysgraphia is how it hinders memory retrieval. A student with this condition can fully understand the material, but the minute writing is involved, the memory becomes blocked. For many older students the amount of blockage is different for print (less) than cursive (more). This is why you will see students unconsciously alternate between cursive and print while taking exams, etc. We mentioned this earlier, but the sequence is well worth repeating since it is a big clue:

-You see answers in the best cursive the student can produce

-They just read or re-read the question (and possibly their answer) so their cursive is the best they can produce. This is possible because thinking and writing were separate.

-Student's cursive becomes sloppier and answers less correct

-They are beginning to have to “think” while writing so the ability to produce letters/words and retrieve information deteriorates. The brain cannot manage the memory retrieval and the writing process at the same time.

-Student switches to printing

-Retrieval is becoming more and more compromised so student **unconsciously** switches to printing. This allows the brain to manage the memory retrieval better---at least for a short time.

-Student switches back to cursive

-Eventually the brain reaches the end of its juggling ability, and the student will not be able to retrieve memory at all. At this point, they will usually stop, re-read the question and their answer up to that point, and then begin again. Now, because thinking and reading are once again separate, you will see the student unconsciously return to using cursive again.

Amazing to see....

It is clear that students struggling with this problem are not producing test answers and other work products that show their true ability. So, what we need to do is teach the student to think BEFORE writing. It sounds simple, but it really does take some practice to learn to think first. Here are some strategies to that I have used and found successful in the past. There is no rhyme or reason to why a student will do better with one or the other, so try them all.....and other similar approach you construct on your own 😊

Air Writing

Remember *Air Writing* from earlier? This is an extremely valuable technique to use as an alternate memory retrieval method. Just have the student “write” the answer in the air if they are very young and won’t be embarrassed. THEN, the student can really write their answer on their paper. This approach works wonderfully for short answer or single word products or tests (i.e. spelling) since the student is using gross motor during the memory retrieval process, so it is not compromised.

Older students may be uncomfortable with such an obvious approach. Definitely this would be noticed by peers! I have found that some do just as well if they quietly write on their leg, in the palm of their hand, etc. with a slightly moving finger. It sounds like this wouldn’t be different than actually writing, but it really is. Fine motor stems from a different part of the brain than writing, so switching to even this similar fine motor task will help some students. Definitely worth a try!



Auditory Retrieval

In this strategy, you are having the student retrieve by *speaking* to themselves, and afterwards, proceeding with writing the memory they have retrieved. At first this retrieval should occur out loud, but with practice, it can eventually be done mentally, especially by older students. With the younger students, you may have to have them practice whispering first so you do not have class disruption. I have often taught children to whisper to themselves with their hand over their mouth to reduce any noise.

There are times students struggle with this auditory retrieval, especially if they have to retrieve and remember items that are longer than one word (i.e. recalling a new sentence for a short answer question versus recalling how to spell a word). In these cases, I have actually used a small tape recorder for a while to directly teach them how to say something out loud before they write it down. During this training period, they may have to practice somewhere other than the main classroom, but it doesn't take long for them to learn the skill. Until then, the tape recorder approach is nice because you now have an audio recording of their answers---a much more valid grade than the written product at this early stage of intervention.



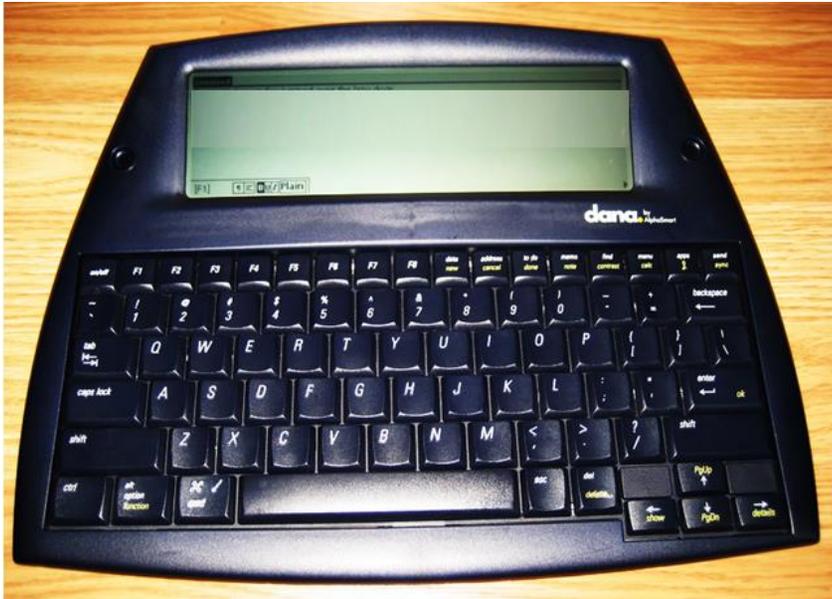
Visual Retrieval

This is a strategy that is less successful for most students, but I have found a few who not only could use it, but became quite skilled at the process. So, to be safe, let's discuss it for a moment.

This method follows the same general guidelines only the "alternative retrieval mode" is now seeing in the mind's eye what you wish to write. The student should actually see the word or sentence being written in their mind like it is being produced on a whiteboard or computer screen. Some will

add unusual twists like seeing the letters dance out on a stage or zoom onto a race track. My attitude is---fine, whatever works for you! So, keep this approach in mind and at least give it a try.

3. Use an alternative to writing by hand: The most common approach, especially for students in third grade and above was the use of an electronic device. The most popular, AlphaSmart (which became the Neo2 and the 2Know Responder) were small, cheap, two-pound, electronic keyboards that have been



replaced by newer technology in most locations. They operated like a word processor with cut-and-paste options, availability of word-prediction software, one button saving and printing of files, and were quite cheap. They are well worth looking for used and can still be easily found in that non-new form.

The student can also use any form of newer technology. With so many options available (e.g., iPads, tablet computers, Clickers for Smart Boards, etc.), you should be able to find something that will work for the student and be useful for the work involved (i.e. math, writing essays, typing answers for fill-in-the-blank sheets, taking spelling tests, etc.).

Just be a bit careful with these newer devices. I am finding that the lack of physical response (i.e. feeling/pushing a button like on a Neo2 versus the glass of an Ipad screen) causes retrieval and typing speed issues for some students with dysgraphia. So, test them with the student whenever you can before settling on a solution. Working with your occupational therapist, and/or special education or literacy specialist is critical to determine which piece of equipment is best since they have experience in this area and often can arrange demo-models that can be tried out for short periods of time before purchase.

An especially interesting group of products is the image and voice capture devices that are emerging on the market.

When a student with dysgraphia is engaged in the writing process, the brain is so involved in the motoric portion of the task; the student has difficulty hearing and/or processing what is being said. Obviously, this is a major concern if the student is older and trying to take notes while listening to instruction.



So, devices like the Echo™ Smartpen by Livescribe (<https://us.livescribe.com/products/8gb-echo-smartpen-bundle-1>), or similar products, capture the writing process in real time. That way if the student is busy writing, drawing, or otherwise engaged in another task, the auditory information that was occurring WHILE they were working is recorded. All they have to do is “roll” the pen over that section of the notes, and a recording of what was being said at that moment in time plays back. These images, written notes, etc. are also transferable to a computer in their exact form and/or for most products, also able to be converted to word processing formats for editing, spell-check, etc.

Here is a link to a video of this device: <https://www.youtube.com/watch?v=olYr4T3nTqo>, but the models and features change so rapidly, be sure to search for other videos too. There are many other videos available showing similar devices manufactured by other companies, so if you decide to go this route, make sure to fully explore them as well.

Needless to say, many students are finding this type of technology useful even if they don't have dysgraphia (or dyslexia, another group that uses this tool often). I am sure as time goes on, we will see even more of these products emerge, so keep your eyes open for more of them...

4. Common Sense: One of the easiest ways to assist these students is to really, REALLY examine your demands. There is no right or wrong answer to these questions because it all depends on your learning objectives. Just remember to take a moment and think about your demands, and it will all work out!

Questions

-Is a full sentence necessary for an answer, or will one word suffice?

-How long does the answer need to be to really assess the student's learning?

-Can this student learn this material without writing?

-Is this student able to learn cursive?

-What is careless and sloppy work for this student?

Note: *Do not permit this even if the student has Dysgraphia! Best effort always 😊*

-Would simple solutions (i.e. enlarging answer boxes, lines for answers, etc.) help?

-Have I asked the student what level of pain and/or fatigue they are feeling?

Note: *This is very important to ask. Many students with Dysgraphia feel pain but will **never** mention it. Often they do not even realize writing shouldn't hurt!*

-Do all teachers involved understand dysgraphia and this student's writing ability and inability?

-What is the true level of spelling and punctuation I can expect from this student?

Intervention

Some students with Dysgraphia will respond well to general classroom accommodations and may need little more. Most, though, will require some level of intervention. While students with the Dyslexic form of dysgraphia will have a more minimal response to therapies and intervention, there IS some improvement, so always at least attempt these easy interventions. You cannot injure by using them.

Play-Based Intervention for Very Young Students

There are a multitude of toys that enhance fine motor development in this age group. Scroll through the photos to be reminded of some tried-and-true toys, and maybe even discover some new ones!

**Remember to develop
Whole-Hand strength....**



**...before intensely
working on Finger Strength**



Use everyday toys that enhance fine motor skills..



...and look for toys that will keep peers with advanced skills busy too!



Create interest however you can....



...by looking for items that engage the mind!



Play Based Intervention for Older Students

As students get older, fine motor practice must become more subtle. If you choose the right materials, ALL students will use them. Lovely for indoor recess! Enlarge the page to see details and product names...

Fantastic ideas for older girls...



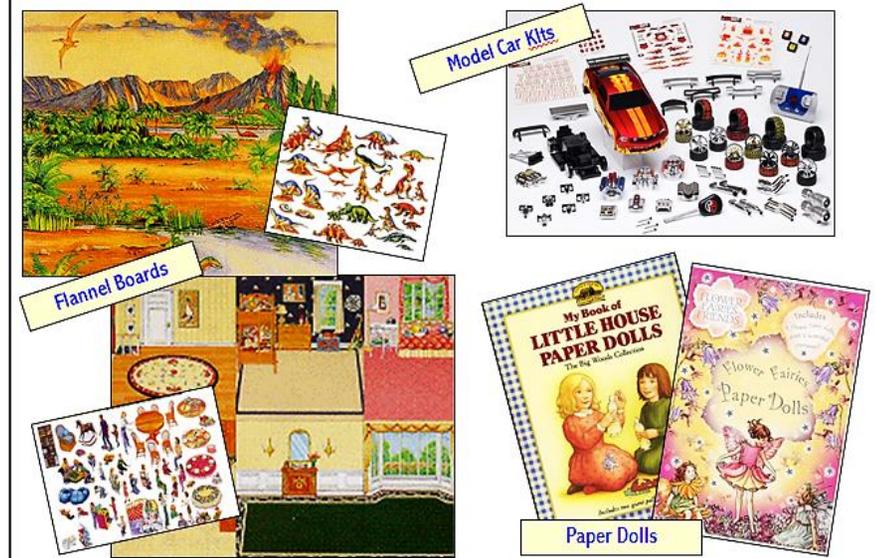
...and older boys



Look for vintage toys at garage sales and auction websites...



...and old-fashioned toys that are still being produced!





As you can see, there is a multitude of wonderful items to try, and many of them will remain appropriate and interesting for students well into middle school. You may have to search a bit for some of them, but I have found the toy and activity collection has actually improved lately...such a wonderful thing to see.

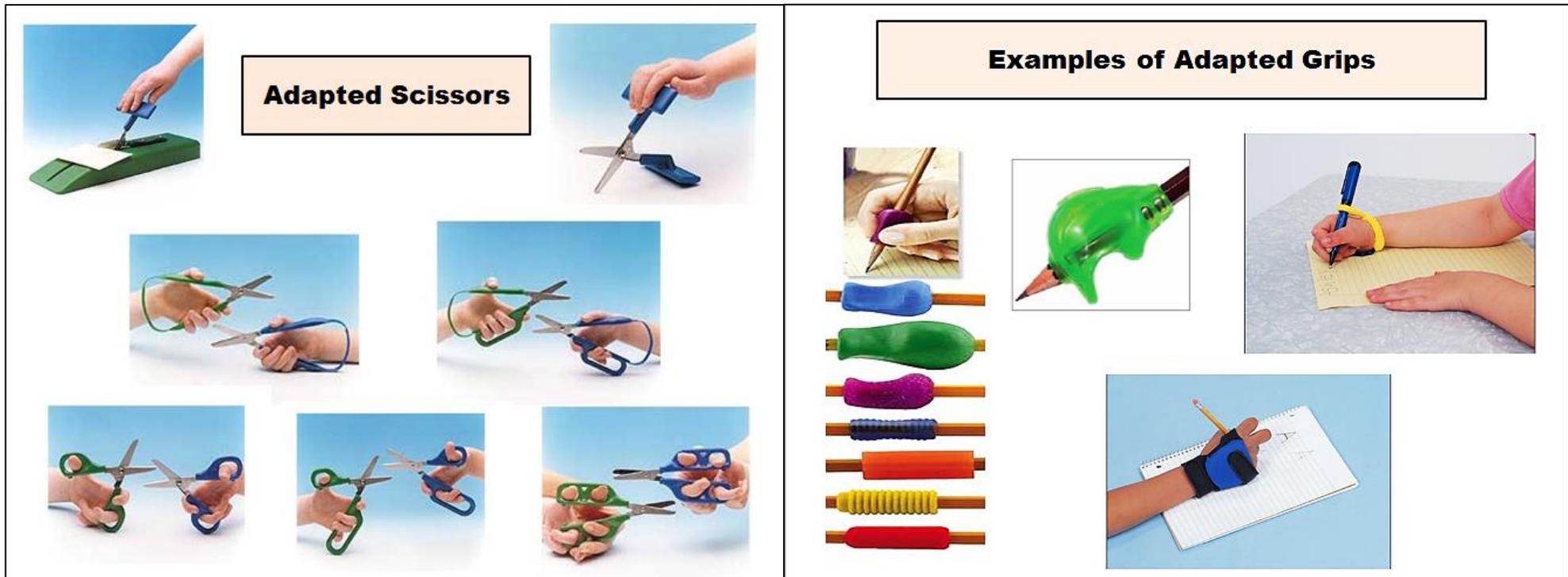
In addition, those of you who have read my unit titled, *"The Missing Cue Sequence: Why Literacy Goals are so Difficult to Reach in the Modern Classroom,"* understand the serious neurological work that will support reading when these toys are used. For those of you who have not seen this unit, suffice it to say that having children play with two-dimensional objects (i.e. flannel boards, Colorforms®, magnet boards, paper dolls, etc.) strengthens the mind's ability to manage symbols, such as letters. Unfortunately, these traditional toys are not as common today, so children are struggling with literacy despite having plentiful reading materials and experiences. So, do not hesitate to use these toys in your classroom with ALL students! You will be doing them an immense favor 😊

Adapted Fine Motor Tools

Some students, especially those who have a motoric form of Dysgraphia, will benefit from adapted scissors, writing implements, etc. These pictures are just representative of the many items for sale.

It is essential to work hand-in-hand with an Occupational Therapist so a formal assessment of needs and the best options can be completed before purchase and/or used long-term use. As you can see, the selection is endless! The subtle differences between the various products, though, CAN mean the difference between success and failure, and for some children, also comfort and pain! So, do not discount the small little differences in design. They really can be important for some children.

Here are just a few examples of some items that you might find useful.... Again, enlarge your viewing area to really see the items!



Examples of Adapted Pens



Grasp is totally flat...

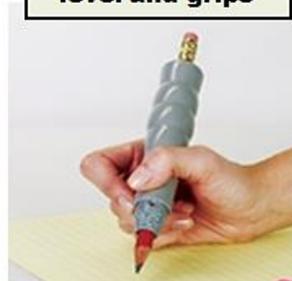


Weighted



Universal Items That Offer Flexibility

Universal Holders:
Can vary weight level and grips



Adjustable Velcro Weights

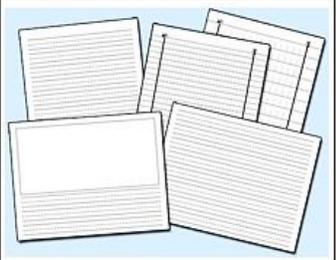
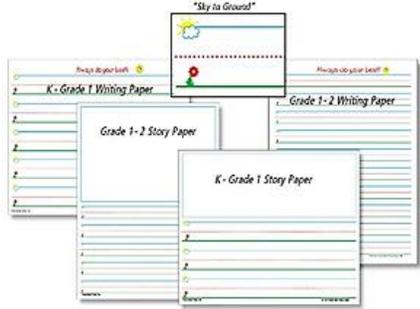
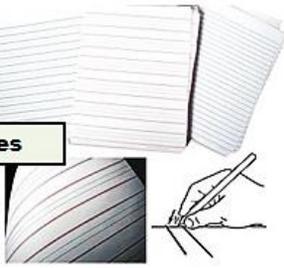
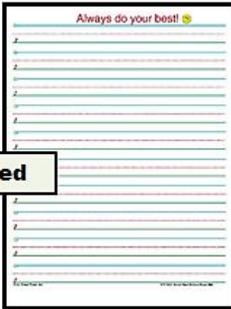


Make your own!
Consider using the following as grips...



Adapted Materials and Visuals

Other students may need other accommodations, sometimes in addition to the adapted tools we just covered. These different papers and positioning devices are not often needed long-term, but when they are needed, they can make such a big difference that their use is well worth the cost. I found that I can also make some of the adaptations myself. For example, a student who finds raised-line writing paper useful may also benefit from raised lines on coloring sheets, etc. I can simply use regular school glue and outline the shapes the night before and let the glue dry to get that slightly raised line that is so necessary. It only takes minutes and is not extremely obvious to peers. Such an easy way to assist a child who needs that little bit of extra help 😊 Here are some of those items that you might want to consider...

Adapted Papers	More Variations to Consider
 	  <p data-bbox="1081 909 1270 982">Color-Coded Midline</p> <p data-bbox="1491 852 1753 925">Adjustable Angles & Positions</p>
	  <p data-bbox="1081 1218 1312 1258">Raised Lines</p> <p data-bbox="1606 1226 1806 1266">Color-Coded</p>

Other Forms of Technology

This last section changes with the wind, so definitely look for these items but also keep your eye open for additional new products over time. I am amazed at the direction the newer technology is taking.

General Software

- Word Prediction**: speeds up typing by predicting next word; also provides spelling assistance (example: *Co-Writer*[®])
- Voice Recognition**: transfers speech to typed file; minimal “voice-recognition training” is required so computer can recognize the student’s voice (example: *Dragon NaturallySpeaking*[®], *Kurzweil Firefly*[®] and *Audio Notetaker*[®])
- iPad Applications**: transfers speech to typed file that can be uploaded to a computer (example: *Evernote*[®] or *Dragon Dictation*[®])
- Math**: Software for math can be more difficult to use; try to get a copy to try out before making a purchase (example: *Math Pad*[®] and *Math Type*[®]--has advanced math versions)

Test-Taking

- Hot Dots**[®]: stickers to indicate correct answer (hot dot) and incorrect answers (cold dots); stickers can be placed on any worksheet or paper product; students register answer with electronic pen
- Scanning Software**: transfers any written page to an electronic file for test-taking on a computer (examples: *WYNN Wizard*[®] and *Test Talker*[®])

Newest of the New

Since our brain is basically electrical in nature, it has the ability to interact with anything else that is also electronic in nature....that is, if there is a way to communicate. For a long time, this type of “communication” was the stuff of science fiction, but no longer. We have reached the point where there are brain-controlled computers, and though the technology is essentially in its infancy, it is progressing rapidly and is in experimental at this time. Some simplified applications of this concept are actually on the market in the form of games.

So, what does this mean for students with Dysgraphia? Well, eventually all of this discussion about adapted software, grips, etc. will be obsolete. All our student will have to do is put on a helmet or halo with electrodes and “think” the answers, and they will pop up on a screen. I know this seems far-fetched, but here are some links showing just this type of brain interface (these tech links change rapidly, so if one is broken, just search for the concept). Very cool technology!

Brain-Controlled Wheelchair

-www.emotiv.com

- <https://www.seminarsonly.com/Engineering-Projects/Electronics/brain-controlled-wheelchair.php>

Brain-Controlled Speech-to-Text

- <https://www.sciencedirect.com/science/article/pii/B9780081024201000418>

- <https://www.youtube.com/watch?v=QzV3h5pfyZ4> (watch mind typing in action)

-Search for IndendiX® (brain-controlled computer)

-Search for Intel’s® “mind-reading” computer

Brain-Controlled Games

-Search for NeuroSky®, Emotiv®, Project Natal®, and Mind Flex®

Resources

Like technology, the resources and supports will vary over time. Please note that some of the best supports will be found in your own community. I have provided some items to get you started, but a simple search will provide many more. If for some reason a link is broken (they change SO often) just search for the primary organization and find their new address, or if worse comes to worse, a similar resource you can use:

<http://www.nclld.org>

(National Center for Learning Disabilities; resources on dysgraphia and many other conditions)

<https://ldaamerica.org/>

(Learning Disabilities Association of America; provides resources on many other disabilities as well)

<http://www.ninds.nih.gov>

(National Institute of Neurological Disorders and Stroke; resources also on other neurological issues)

<http://www.interdys.org>

(The International Dyslexia Association; look for link to Dysgraphia)

<https://dyslexiaa2z.com/learning-difficulties/>

(Look under “Dysgraphia” tab. This is just an example of the many resource pages constructed by different groups and teachers)