

Scenario 1: Derek

Derek is a new student who is a braille reader in the third grade at Monarch Elementary in South Carolina. His family has just moved from Florida, and Derek is having difficulty adjusting to a new school and struggling in math. Specifically, he is struggling to learn the Nemeth Code within UEB Contexts, and he does not know his basic math facts. In addition, Derek's paraprofessional is encouraging him to do as much as possible orally. Derek's mom has stated that she has tried to learn braille, but she just doesn't understand it and cannot understand how Derek is able to read it.

- a. How can you make learning the Nemeth Code within UEB Contexts fun for Derek? What materials or online resources might you use to help Derek learn the code? In addition, what materials might you order to help Derek learn the code?
- Creating games that could be played using available materials and manipulatives would be a fun way for Derek to learn Nemeth within UEB context - use games, not drill and kill. Materials that could be used to teach math basics as Derek learns Nemeth within UEB context include addition/subtraction braille flash cards with print. This would provide Derek's mother an opportunity to drill him at home, as well. Other manipulatives might include Digi-Blocks to be used for counting games. Examples of games that could teach math basics include:
 - Math Bingo - math facts would be read to Derek, then using APH Feel 'n Peel Stickers he would place what he believed to be the correct answer on a tactile bingo card. The game Zingo can be adapted by putting braille Nemeth numbers on the boards and chips. The game is a bingo format using numbers and simple equations. This would also encourage peer and team activities.
 - Math Match - using APH Nemeth math drill cards, the student would match an addition problem and its sum with the inverse subtraction problem and its difference to teach the student numerical relationships.
 - Abacus- once the student is confident in his math facts, using an APH Crammer Abacus will assist in heightening his mental math skills.
 - Braille maze activities, flashcard games, dice activities, iPad app, Math Robot app, [Braille Yahtzee](#), Card games such as Go Fish or War, [Candy Corn Braille Nemeth Matching Game](#), Pick-a-Pair, Coding, [Braille Legos](#), [Slapstick Math](#) app, [Rollin' with Math Problems](#), [Math Melodies](#), [Perkins Math Games](#), and [Shut the Box](#).
 - Number cards can be used by picking a random card and using manipulatives like APH Base Ten blocks to show how many items, then also set this number on the abacus. After the number is seen on the card, have Derek set it on the

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abacus, count that many items, and braille the number on his Perkins braille. Each time he is able to show each number correctly these three different ways, Derick will record his success on an APH scorecard. Derick will receive a predetermined reward when either one line (10) or the entire card (20) is filled. There are so many educational games that are played in the classroom that can be easily adapted in order to assist the student in learning the braille code-gamification. Check out this website for a list of some ideas:
<https://www.weareteachers.com/third-grade-math-games/>

- Exceptional Teaching sells the Mangold Nemeth code Kit and the Mangold UEB Number Recognition Kit where you can work on skill level or the practice sheets from the [Braille Too curriculum](#).
- To determine how much of the Nemeth Braille Code within UEB Contexts Derek is familiar with, I completed an assessment using the Post-Test and the check-up sheets, and it was determined that Derek needs to start at the beginning of the Pearson Nemeth Braille Code Curriculum. The first few lessons may be review, but I feel he will benefit from it by giving him much success to boost his confidence and give him a chance to show me what he knows. In addition to going through this curriculum, I will need to pay attention to what Derek is learning in his math class and make sure to pre-teach the Nemeth symbols that are included in the class materials. Derek needs much use and practice with varied math manipulatives, including [Omnifix Cubes](#), to help him understand the basics of multiplication using arrays, Place Value Setter from APH, and Math Flash from APH. I would send home an adapted set of Uno cards so he can play a fun game with his family. I would also provide an abacus, a braille ruler, many Wikki Stix, a [hundreds chart](#) from APH, a [Math Line](#) (adapted basic model), raised-lined number lines with braille dots on them, and an APH Draftsman. I would provide many manipulatives and counting bins, trays, and baskets to develop fun counting and math games. Derek can be shown how to use the Perkins Braille Writer to draw tally marks and how to use a 100's Chart from APH to use shapes to build a bar graph. TicTacToe game cards and the Connect Four game can all be adapted for Derek to play and enjoy with his sighted peers and he would be learning math concepts at the same time. Legos with braille math symbols on them could be ordered at <https://www.legobraillebricks.com/getbricks>
- The first thing I would do, would be to contact Derek's mom to learn more about him. Learning his interests will help me as I go forward with buying materials and making adaptations for both school and home. I would begin by reviewing educational records, evaluating IEP goals, and reviewing his most recent FVA/LMA from Florida. I would consider the baseline data and develop an action plan for observation, direct interventions, and collaboration with his educational

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team and family. I would then use his preferred interests and areas of strength to build upon his areas of challenge. Because he is a new student, I would promote peer-to-peer interaction through created games, commercially produced games and other classroom-based activities to promote his learning. I would likely seek much input from his family and help generalize or transfer his learning to the home environment through the use of video demonstrations and tutorials. To ensure progress over his baseline I would utilize the State Standards to assess current and future Nemeth needs (<https://ed.sc.gov/instruction/standards-learning/> or <http://www.corestandards.org/read-the-standards/>) and seek tangible materials to assist the Gen Ed teacher and Para to support his progress. I would create math activities that are meaningful for him. An example would be to use his trip or move as a real life experience in creating math problems, such as how many miles from Florida to North Carolina or how many states or cities did he travel through. You can use counters, the beginners or hundreds abacus, or tally marks. With these activities in mind, we can use an APH tactile map, or additional tactile and online materials for supporting evidence.

- A mobility lesson that includes finding and reading classroom numbers labeled in braille would benefit Derek in his knowledge of the school's layout and reinforce his basic number reading skills. Money problems with coins to identify and use in problem solving, along with role playing while making a purchase, can utilize social skills, math, mobility, and reading.
- Have fun explaining that the Nemeth Code turns on and off, just like (find out what Derek likes!) and use an analogy here. For example, if Derek likes to play baseball, how about showing how the DEFENSE comes on the field or the OFFENSE is up to bat...little ways to include what Derek enjoys as a part of the understanding how Nemeth within UEB works. NEMETH is not always on the field! But let's turn on NEMETH now! Let's turn it off now!

b. How can you assist Derek in becoming more proficient in his math facts? What materials might you order and what materials might you develop?

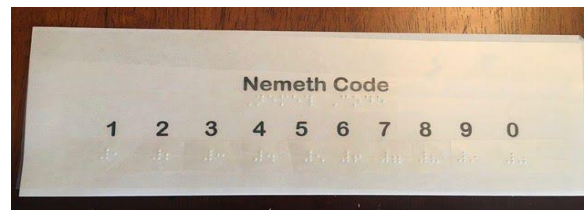
- It will be important for Derek to memorize basic math facts. He should also practice math facts for a designated amount of time, daily (about 10-15 minutes), using an array of math activities to help increase his momentum and confidence. Implementing technology may be an incentive for Derek as well. For example, using iPad apps, such as, *My Math Flash Cards App*, *Math: Splash Math Worksheets App* or *Flashcards+*. Create worksheets of math facts that Derek could take home to complete for more practice. Califone Language Master may be a fun way for Derek to practice Nemeth.

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- Quick Pick math drill cards from APH; [Math Window](#), which has both print and braille on magnetic tiles to build spatial math problems; depending on the student's abilities and needs, provide a talking calculator to Derek so he can check his math facts to see if he recalled the answer correctly, and teaching him calculator skills which he will use as he gets older.
- There are so many materials that can be adapted in order to encourage Derek to practice and, in turn, become more proficient in his math facts. I think it is important to develop appropriate worksheets, create games, use cards, dice, and other materials that are commonly found around the classroom and easily adapted in order to meet Derek's needs. Activities should be engaging, meaningful, and accessible in order to ensure success.
- Make contact with his Teacher Consultant from Florida to get a better picture of him in the classroom. The questions I would ask would primarily focus on what equipment he used, what specific areas he struggled with and what they have already tried as far as math manipulatives. By talking with the parent and the specialized teacher, I will have hopefully learned his likes and dislikes which will help me to make learning fun.
- I would introduce the Nemeth beginning and ending symbols to Derek, create short worksheets in which he had to find them, and have him read them aloud and tell me when the Nemeth section was starting and ending. I would then have him preview pages from his math textbook or workbook to become familiar with finding the symbols in his classroom materials, and ensure he is comfortable reading them in class.
- If Derek has issues with understanding the concept of regrouping, I would order the [APH Work-Play Tray](#), with the [inserts](#), and have the teacher work with him on the concept with [base-10 blocks](#). Review Derek's current understanding of the concept of fractions with the [Flip-Over Concept Book: Fractions](#) and consult with the teacher on any gaps in understanding. We might use the [Fractional Parts of a Whole kit](#) or [Fraction Tower Fraction Cubes](#). Throughout this process, I would have Derek practice writing his answers on both the braillewriter and his braille notetaker (if that is his current device) and work with an assistive technology specialist to begin to access some of these materials digitally.
- [APH Math Builders](#) Kits would be ordered to cover the concepts being taught in third grade in South Carolina. The concepts would be experienced by Derek in a separate pull out prior to introduction in the class so he had time to look over the material, ask questions, and gain expertise using the manipulatives to accomplish the task.

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- Preparing spaces-
 - Desk space: This space is important for access to materials and consistency. I recommend keeping his Perkins in a regular space along with braille paper. Creating a simple Nemeth Number Guide that adheres to his desk space, off to the side of where he works, provides access to the braille he needs until proficient. Not to mention, his Paraprofessional can use it to guide her learning. I print the numbers, then laminate before adding the braille stickers. Strapping tape works well around the edges to keep in place. Example:



- Math Center: Using a small bookshelf or cart, Derek can help organize his math materials. Derek can make braille labels for materials and their corresponding drawers. The center must be easy to access and stay organized. Sometimes schools have unused furniture in a storeroom; likewise, a District may have a warehouse or area with old furniture. Sometimes you'll find exactly what you need. Teachers may have something to offer as well.
- A good way to help Derek be more proficient in his math facts would be to create treasure hunts. He will have a card with directions to find a specific location and there will be either a card with an equation for him to find and solve to help him find the next clue. For instance, the first card might say "Go to the classroom door and turn right. Find a card that tells you how many more steps you need to take to find the next clue." The next card would say "3+3 = ?" in Nemeth. He'd solve it and know he has to go 6 steps to find the next clue. There are also lots of tricks such as using tally marks, Unifix cubes or some kind of manipulative, or counting with his fingers that I could help him with.
- I would "pay" Derek for helping with recycling braille paper, braille textbooks he will no longer utilize, worksheets completed by his classmates in the general education class, newspapers from home, whatever. My school has a recycle center where all materials to be recycled are placed in special bins. The COMS could provide O&M training to/from the recycle center and the student is responsible for collecting all papers and transporting them to the recycle bins. "Payment" is recorded in a table using Nemeth (Date, amount earned) and at the end of each week, the student writes the equation for the total amount earned and either "spends" his earnings on treats, games – whatever the

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student chooses – or “saves” part or all of his earnings to purchase more expensive items at a later date. If that particular teacher has a reward system, I try to tap into that reward system, as well.

- Mental Math Magic Tricks – I would teach Derek a magic trick that he could use at recess or during class. Third graders love “magic” tricks. I would have Derek braille the necessary Nemeth chart and teach him the “secret” of how he can know which “secret” number his friend chose. I would provide a print version of the chart that he can give to his peer, so Derek can demonstrate the “trick”. Check out Mental Math Magic in “12 Amazing Tricks” from National Braille Press. <https://www.nbp.org/ic/nbp/search.html?q=tricks>
 - AccessiByte is a fully accessible program that was designed specifically for students who are visually impaired. Product offerings include flashcards, games, and a program that creates “to do” lists to improve organizational skills. I utilized two of the products last spring, and I am advocating for the district to subscribe. <https://www.accessiByte.com/products/>
- c. What can you do to get his paraprofessional on board with helping Derek learn Nemeth Code within UEB Contexts? Assuming she is not familiar with braille, how can you assist her in learning some key symbols in Nemeth Code to help Derek when he can't remember something?
- During the designated math practice, the paraprofessional could assist Derek in learning his math facts in Nemeth within UEB contexts, using the math flash cards, games and worksheets. Print could be written over Derek's braille assignments, flash cards, game cards, etc. and/or a print copy of the assignment be provided to the paraprofessional, for reference, when assisting Derek during class assignments and/or math practice.
 - In order to support the paraprofessional, provide her with several references (cheat sheet) with all of the Nemeth symbols on it, so she can have them handy. List all of the symbols listed on the student's IEP goal, as well as numbers, opening and terminating Nemeth indicators, and other symbols they may find useful throughout the year. This folder can be added to, as needed, and also includes a couple of sheets for their own personal notes. Resources to check-out: [APH Nemeth tutorial](#), [Nemeth symbols library](#) - this is where she can look up terms, definitions, and examples of symbols, [Braille Authority of North America](#) (BANA), [Nemeth Code Cheat Sheet](#), and [AHP Nemeth Reference Sheet](#). I would encourage her to sign up for the classes to teach Nemeth Code within UEB Contexts through Paths To Literacy. I would provide her a Perkins braille writer from my office or show her how to download Perky Duck for practice.

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- Ask the classroom teacher and paraprofessional to solve lengthy math problems without writing anything down, trying to keep it light-hearted and just demonstrate how hard it is. She needs to understand that doing math orally will be extremely difficult for him as soon as he gets past the most basic problems. It's only a last resort, when there isn't time to write down something for him, but he can't learn efficiently that way.
- I would emphasize that it is the paraprofessional's responsibility on a day-to-day basis to ensure that Derek has access to tactile materials, and that going forward that means access to brailled materials and manipulatives. I would create a "cheat sheet" for the numbers with associated dot numbers, as well as all of the symbols that Derek has learned to date with their dot numbers. The para should then assist Derek only when he requests it. The para can remind him of dot numbers if he needs the feedback when he is writing his answers. In addition, if Derek struggles to read a problem, the para should consult the print copy to verbally assist him. I would reiterate that the aide needs to have a reference sheet to assist as necessary.
- References sheets:
 - https://ataem.org/up_doc/ueb-quick-reference-chart.pdf
 - http://www.duxburysystems.org/ximages/ueb_black8.pdf?type=8
 - http://www.teachingvisuallyimpaired.com/uploads/1/4/1/2/14122361/ueb_braille_chart.pdfNemeth at a Glance: A Math Resource, Grade-Level Chart, and Evaluation Tool (59453 NEMP) from TSBVI
- The paraprofessional is my eyes and ears in the classroom when I can't be there, so having them comprehend the frustrations Derek may experience in class is key. By helping them understand and anticipate these challenges and how simply sharing the same information in a format Derek can understand and work with will make a world of difference in his learning, and in addition his behavior. Some apps (free and \$) I would share with the paraprofessional that they may want to use in the classroom if they are stuck and Derek is stuck on a braille symbol:
 - Brailliac Braille Tutor (android)
 - Braille Tutor (iOS)
 - Braille Contraction Lookup (android)
 - UEB Prep w/ MathType support (iOS)
 - Braille Sonar Pro; supports Nemeth (iOS)
- The [Braille Bug](#) website has fun games and learning materials to teach the simple numbers and literacy UEB braille symbols. Each year I do training for the para-educators and explain the importance of their job and what is expected. I

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would encourage the para to take the [APH classes](#) for professional development and in-service credit. I would also provide a swing cell, now called the swing cell compact, to practice and demonstrate the braille symbol construction.

d. Is it appropriate for Derek to complete the majority of his math assignments orally? Why or why not? What would be your next steps?

- It is not appropriate for Derek to complete the majority of his math assignments orally. As a visually impaired student, Derek requires concrete and perceptive methods of instruction for his comprehension, understanding and relaying of new information. Completing all math assignments orally would prevent such instruction from taking place. In addition, the primary practice of oral administration/response could hinder Derek's use of concepts and calculation procedures of math. It could further delay Derek's ability to explore and solve mathematical problems. Finally, the mass implementation of oral administration/response could cripple Derek's learning of Nemeth within UEB context, limiting his exposure to braille, his primary medium. In weening Derek from the use of total oral administration/response, the paraprofessional must be advised that this practice is not the best method for Derek to complete all of his assignments. Allow Derek additional time to read and understand directions of the problems presented. Limit the amount of work presented at one time, gradually increasing it, as Derek becomes more confident and proficient. Advise the math teacher that every worksheet, activity, etc. the class is receiving a paper copy of, the braille reader should also be receiving an accessible, braille copy. This way, the student is held more accountable for reading and answering math problems and is becoming more independent in learning the Nemeth Code.
- I would invite the paraprofessional to sit with Derek and me during our time together when Nemeth is being taught. After she sees how important it is for Derek's future math success, I hope she will be on board in supporting him with more than just oral math activities because it is not appropriate for him to receive math assignments orally. I would also explain this to the General education math teacher so she can be proactive and supportive of this. It could be added into Derek's IEP that he will receive his math instruction using embossed work (with interlining to support the paraprofessional and parents) and hands-on manipulatives.
- The math teacher and paraprofessional are a key piece in moving forward. In my opinion, teaching at the same rate as Derek's peers helps him to have more self-esteem and shrinks the feelings of being segregated in the classroom. Each of them can give me work ahead of time so I can look it over to modify it. I think at this time, reducing the assignments to 50 percent would be beneficial

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to give him more time to focus on learning the Nemeth code in addition to the facts being taught.

- I believe that it is completely inappropriate for Derek to complete the majority of his math assignments orally. This greatly impacts his ability to independently recognize the math symbols, increase his math reading fluency, independently review information, and produce his written answers. It is not the purpose of a paraprofessional to have a student complete work more quickly or more correctly, the purpose is to ensure the student has tactile materials available when they are appropriate to the task, which they certainly are here. I often remind teachers, paraprofessionals, and case managers that we need to think in terms of long-term goals, including successful participation in high school, college, and the workplace. By making it “easier” on themselves this year, they are negatively impacting Derek’s skills, which will only snowball as he proceeds through the grades.
- In addition, Derek should know how to use the abacus and the talking calculator from APH to solve math problems. He should be able to explain the steps to his teacher orally.
- No. It would be impossible for him to do complex math problems that way. We have to prepare him to be able to do advanced math just like we prepare every other student. I have to go in considering that he might be a future mathematician. I would switch him to writing and have his paraprofessional work with him to help him read it, if he needs the assistance. But he needs to have something under his fingers, even when he’s not doing Braille, even if he has to practice the concepts with blocks or a 10 by 10 grid.
- The first step to remedying this is figuring out why the paraprofessional encourages Derek to answer orally? If it is because the work is not being provided with enough time to be brailled, then this needs to be addressed first. This would mean talking with both the paraprofessional and the teacher to make sure that for the most part assignments are prepared ahead of time. It is important to talk with the teacher when Derek first came to the class to set up a schedule for when assignments need to be given to me for adapting. It is important for everyone on the team to understand the time and effort it takes to adapt materials. “19 Ways to Step Back” found at <https://www.perkinselearning.org/transition/blog/promoting-independence-19-ways-step-back>. This is a perfect way to make sure Derek is becoming an independent person who knows he can do for himself and does not need someone else to do things for him.

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- I cannot answer this question without observation and collaboration with the sending district. Should Derek have a physical impairment impeding efficient production of Braille, oral completion could be a requirement. Should Derek lack Braille production due to a lack of instruction I would work with his educational team to amend the current IEP to add instructional and consultative minutes. I would also balance his methods of expressive and receptive literacy based on the educational outcomes, teacher expectations for all students and the curricular expectations. I think pairing his oral answers with hard copy Braille could be an effective intervention but that may require additional services, training, and/or consultation from the TVI if the Para is not proficient in Braille or Braille production. The use of available textbooks and supplementary materials would also be critical in Derek's ability to merge oral and written communication.
 - At this time, it is important that Derek continue to complete math assignments orally; however, a plan needs to be in place to phase out dependence on oral instruction so that Derek becomes a fluent braille user. Derek is obviously an oral learner and it is one of his strengths, but should not be his only means of accessing educational materials. In order to begin comfortably reducing the dependence on oral instruction, I would set weekly goals with Derek. For example, one week Derek's goal may be to use his Math Window to complete 3 out of 15 math problems. The following week, Derek can increase his goal to use his Math Window to complete 5 out of 15 math problems. By incorporating Derek in the goal setting, it will help him progress at a comfortable level without overwhelming him.
 - The main goal in the general education math class is to learn the content. I cannot expect Derek to deal with the frustration of READING the code at the same time he is dealing with the frustration of LEARNING the math content. I would observe Derek to evaluate the amount of time he can deal with the frustration and establish a baseline – i.e. I observe that Derek can read and complete three math problems before he gets so frustrated or so far behind that he is unable to maintain comprehension in math concepts because of his inability to read the braille. I would have Derek read and complete the first two math problems, and then have the para assist him in reading the problems. Or perhaps he can read linear math problems but not spatial math problems. I would have him read the linear and the para read the spatial until I can provide enough instruction to improve his skill level.
- e. Is it important that you assist Derek's parents in learning braille – both the literary and the math codes? Why or why not? Will helping Derek's parents learn the braille codes help Derek academically? Justify your answer.

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- As TVI, it is important that I assist Derek's parents in learning braille - both the literary and math codes. Exposure to braille is essential to Derek's success. Encouraging the start of a braille with print book collection to read during family reading time could motivate Derek and his parents to learn braille. In addition, labeling braille correspondence and assignments, creating a braille reference sheet, recommending a braille class, and connecting Derek's parents with other parents of visually impaired students are ways to help teach and encourage the importance of learning braille. If Derek's parents are unable to encourage this medium for lack of interest and/or understanding, chances are, Derek, himself, would not perceive its importance. This could negatively impact Derek, academically, as well the other specific areas of the ECC, since there are many concepts that cannot be taught to full comprehension, orally.
- In order to encourage and support Derek's parents in learning both literary and math braille codes, which in turn will help Derek academically, I would invite them to the twice yearly parent engagement night that is put-on by the Vision Services Department. During this night of information, fun, and games, all the resources are provided on how parents can sign up for Hadley classes and all the other places where parents can learn these important skills to support their students. They can learn how to set up their homes so incidental learning can take place all day everyday: measuring while cooking and teaching daily living skills, just to name a few. Each year everyone walks away with needed resources and motivation to make this world a little more accessible to students with visual impairments. Also, provide information from any local organizations that provide braille workshops for parents.
- I find that when parents feel overwhelmed by braille, they are more likely to be resistant to assisting their child or even accepting braille as a reading medium. I think it is important that the parents understand that we do not expect them to learn the entire braille code, literary or math, but that they need to support their child's language and math literacy until the student can read and complete assignments independently. To this end, in the younger grades I communicate with the parents, via email, a note home, or a communication book, when I introduce a new symbol, and give a brief description of how it is used, so they are aware of what their child is learning. I ensure that any worksheet, workbook, or textbook that is sent home in braille is accompanied by a print version for the parents. Since Derek may at first struggle with number recognition, I would write the page numbers on the braille versions until he is comfortable locating and reading them himself.
- Yes. When Derek does homework, he needs people who can help answer his questions or look at his work. Most children ask their parents questions when they're doing their homework. It's best for Derek if he can do the same. It will

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be difficult for his parents to help him if they can't read the problems or his own work. I would suggest they learn it along with him. They don't have to know enough to become transcribers, just like most people don't know enough to be editors. As long as they can read it, that's good enough.

- In my opinion, it is the parents' choice to learn (or not learn) Braille. It is my responsibility to offer resources, foster relationships with consumer groups, and offer training should they have the desire to learn. I would share our Districts' use of the free UEB Online (www.uebonline.org) program to learn UEB Braille and Math while also offering resources for the Nemeth Code, abacus, etc. to ensure a complete approach to expressive and receptive Braille literacy. I'm not convinced Derek's academics be "helped" just because the parents know Braille. I choose to hold this perspective based on my experience of non-engaged, non-committed parents as well as many parents who perceive they do not have the skills or knowledge to help their child with academics. The engagement of a child's progress in all areas of the Expanded Core Curriculum will be tied to the parent's initiative, engagement and support of the child - if they don't make or take the time to sit with the kiddo, their knowledge of Braille, or chemistry or cooking is meaningless. I will continue to bend over backwards to educate and inform the entire educational team (including the parents) about the importance of literacy and provide supports as requested. I would not treat the student using braille any different than I educate or treat my students who utilize large print and/or regular print. I plan on each one of my students being part of the 22% of adults who are legally blind becoming tax payers.
- The importance of braille for an individual who is blind can't be emphasized enough to families ([What Braille Means to Our Son and Family](#) by Susan Harper, MS Ed.).
- I would encourage them to check out the Paths to Literacy website for a plethora of ideas, information and support. Social media sites for parents of braille readers could also help them find a community of which to be part that will have shared experiences. Derek's parents would benefit from knowing that having the ability to offer Derek assistance at home with his work by learning braille codes will also help build his confidence. The more confident Derek feels in his braille skills the more success he'll have in the classroom. These websites and resources would be shared:
https://hadley.edu/learn?topic_id=15
<https://www.pathstoliteracy.org/blog/dots-families-braille-lessons>
<https://uebonline.org/getting-started/ueb-literacy-program/>

Math Games

Buzz: For this activity, the student draws a card and reads the symbol aloud. If the student reads the symbol correctly, he/she keeps the card. The opponent then takes a turn doing the same. When a “buzz” card is drawn, the student has to return all cards they kept back to the drawing pile. This game is quick and easy, but allows for quick and repetitive identification and exposure to various Nemeth symbols.

Dice: Order jumbo dice or make your own! Then adapt with braille on sticky labels. Symbols include Nemeth Numbers (use 2 dice); on another dice, place +, -, X, /, Nemeth Opening and Nemeth Closing Symbols. Start with one dice and work up. Derek will have fun rolling a number die, then a symbol die, and the other number die, to create his own Nemeth equations!

Bag of Numbers: Using a simple bag or box, put several math flash cards inside and have Derek and his buddy take turns pulling out a card and reading it. Cards have both print and braille.

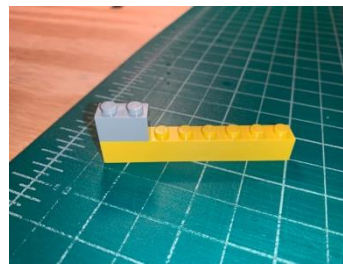
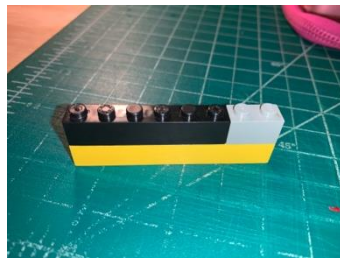
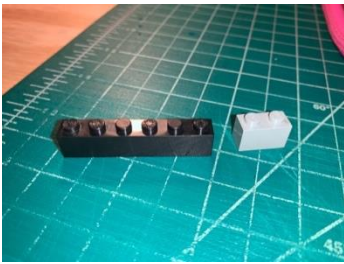
Open Door, Close Door: As Derek navigates the building, he tells his Para the dot combination for opening Nemeth Code each time he opens a door; likewise, he tells the combination for closing Nemeth Code each time he closes a door.

Lego: Use blank wooden tiles and the APH feel n’ peel math symbols sheets (<https://www.aph.org/product/feel-n-peel-stickers-nemeth-basic-math-symbols/>) to label the tiles. I would use these tiles in each Lego problem and have the student use the blocks to complete the math. Once the student has learned how to read and use the braille Lego blocks with the signs of operation tiles, we would play a math card game. There will be two stacks of addition problems and two stacks of subtraction problems cards. A box of braille Lego blocks, a box of regular Lego blocks, and a pile of signs of operation and comparison tiles will be set on the floor. The student and I would draw a card from each stack and use the supplies on the floor to represent the problem on the cards. The first person to complete their stack and have the correct representation of each problem with the Lego’s and tiles will win. The points will be added at the end of the week and if the student gets the most points for that week the student would be allowed to choose a leisure activity for the last 30 minutes of class on Friday’s. Below is an example of a math problem with regular Lego’s and the feel n’ peel stickers.



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Use regular Lego blocks and teach single digit addition, followed by single digit subtraction. Using the problem example: $2+6=8$ I would take the Lego block with 2 pegs, one with 6 pegs and have the student count the pegs, starting with the 2 pegged block. The student would feel the block and count 1, 2, then he would do the same with the 6 pegged block 1, 2, 3, 4, 5, 6. He would then place the blocks side by side counting 1, 2, 3, 4, 5, 6, 7, 8 pegs. I would then find the Lego block with 8 pegs on it and have the student place the 2 and the 6 blocks on top of the 8 blocks to check his answer. I would continue using Lego's to teach multiple addition problems. Subtraction problems would be the same except we would start out with the 8 Lego block with 2 on top and ask him $8-2$ is what? The student would count the remaining pegs that are not covered, he would count 6 pegs. Below are pictures of the Lego addition and Lego subtraction problem. After the student has learned how to use the Legos to add and subtract, we would play the card game again. Below are pictures of the math computations using the regular Lego blocks.



BATMAN AND SUPERMAN GAME: (practicing numbers and letters)

NEEDED:

Bat Man and Super Man moving pieces

Brailled number cards (there will be 3 of each number)

Brailled ABC cards (there will be 3 of each letter)

The large egg carton with 30 spaces.

















1. Derek takes a number card either from the top of the pile, or you can hold the cards up and say "Pick a Card, any card".
2. He reads the number in braille and then checks the back to see it in print.
3. Let's say he picks number 5. You give him 5 ABC cards.
4. Derek has to read those 5 cards. If he reads 4 correctly, then he moves his piece 4 spaces. If he reads 3 correctly, he moves 3 spaces and so on.
5. Put any letters he missed back into the ABC pile for more practice.
6. Then you take a turn.
7. First person to move to the end of the egg carton WINS!

Assignment 2 Scenario 1

Patricia Balassone

- A. I have no first-hand knowledge of any of the [Pearson Accessibility](#) resources but would look to them for guidance. Also, it might be fun to create word search puzzles or bingo games to reinforce some of the Nemeth symbols. And if the puzzles or bingo cards included print, his peers could play too. [See page 2 and 3]
- B. It might be fun to use the [Math Flash](#) video game from APH. Being an electronically interactive game, it might be more appealing than simple rote practice.
- C. I would provide for the paraprofessional a cheat sheet so she could understand and help clarify for Derek what his assignments are teaching and how to answer correctly. [See pages 4 and 5] I would like her to participate with the teaching that I the TCVI would be conducting. And if she were interested (something I might encourage both with her and the administrators) I would support as best I could her learning braille. I might also encourage her to practice with the Quick Pick flash cards.
- D. Doing math orally is fine for some of the smaller assignments, it might help his mental math acuity. But as he advances to more complicated math in successive grades, it will be harder and harder to keep all the information in his head. It is very important for Derek to learn how to use Nemeth to access math.
- E. I don't believe it is important for Derek's parents to learn braille unless they were very motivated to do so. It is a task that requires a good deal of discipline, which the casual user does not possess. You might provide them with a cheat sheet of common braille symbols such as the beginning and ending Nemeth Indicators, and perhaps some of the basic arithmetic signs. Instead I think the more helpful thing to do for Derek is to have his parents work on his grasp of math. This can be accomplished several ways. If the school district has a direct line of communication with parents via a learning portal, make sure that his parents are connected. This would allow Derek's parents to view in print the assignments so they can at least clarify what Derek might be reading especially if the handouts he brings home are only in braille. I would also send home some of the tools, like [Quick Pick](#) cards and perhaps a sorting tray for practicing math concepts.

Nemeth Bingo Card

| | | | |
|---|--|--|---|
| Minus sign –  | Number Indicator  | 9  | 1,233  |
| 0  | Open Nemeth Indicator  | Addition Sign +  | 68  |
| Mathematical Comma ,  | Equal Sign =  | 147  | Multiplication Dot ·  |
| Multiplication Cross x  | 5  | Division Sign ÷  | Close Nemeth Indicator  |

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|--|--|--|--|--|
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Braille Symbols and Examples of Use

⠠ Numeric Indicator (dots 3-4-5-6) to be used preceding numbers

1 ⠠⠠ 2 ⠠⠠ 3 ⠠⠠ 4 ⠠⠠ 5 ⠠⠠ 6 ⠠⠠ 7 ⠠⠠ 8 ⠠⠠ 9 ⠠⠠ 10 ⠠⠠⠠ 214 ⠠⠠⠠⠠

⠠ Mathematical Comma (dot 6)

3,475 ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠ 1,000,000 ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠

⠠ Plus or Addition Sign (dots 3-4-6) no spaces before or after when used in a math sentence

7+5 ⠠⠠⠠⠠⠠⠠⠠⠠ 2+3 ⠠⠠⠠⠠⠠⠠⠠⠠

⠠ Minus or Subtraction Sign (dots 3-6) no spaces before or after when used in a math sentence

3-1 ⠠⠠⠠⠠⠠⠠⠠⠠ 8-4 ⠠⠠⠠⠠⠠⠠⠠⠠

⠠ Multiplication Cross x (dot 4, dots 1-6) no spaces before or after when used in a math sentence

3x5 ⠠⠠⠠⠠⠠⠠⠠⠠⠠ 18x2 ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠

⠠ Multiplication Dot · (dots 1-6) no spaces before or after when used in a math sentence

2·6 ⠠⠠⠠⠠⠠⠠⠠⠠ 15·3 ⠠⠠⠠⠠⠠⠠⠠⠠⠠

⠠ Division Sign ÷ (dots 4-6, dots 3-4) no spaces before or after when used in a math sentence

21÷7 ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠ 4÷2 ⠠⠠⠠⠠⠠⠠⠠⠠⠠

Scenario 2: Simone

Simone is an on-grade level 4th grade braille reader at Thunder Elementary School. She has access to an iPad and braille display in which she takes notes and can send assignments to her teachers, via a cloud-based school program (i.e. OneDrive or Google Drive). Mrs. Iyer is her math teacher, and Mr. Gonzales is her science teacher. These teachers often collaborate on lessons to embed math concepts into the science lessons and organize a cumulative project at the end of the month. Both teachers have a school webpage outlining the math and science standards they will be teaching along with supplementary worksheets. Next month, the students will apply the area and perimeter formulas for rectangles in real world and mathematical problems. Simone will be working with a small group of peers to measure rooms in the school, calculate area/perimeter, and create a presentation about the project for the rest of her class. All of the information will be documented in a group, cloud-based school program. In the past, Simone has taken on the role of being the note-taker but has expressed a desire to try a different role during group projects.

- a. Describe any concepts you may need to present to Simone prior to this month's project. Consider the accessibility of the supplementary worksheets.
- Meet with Simone's math and science teachers to learn what concepts Simone will need to learn. From this, I can figure out what braille materials she will need. I will find out what math terms will be used and the types of activities that will be conducted. I can also make suggestions for how to make the activities more accessible and meaningful. Supplementary worksheets will need to be translated and embossed ahead of time. Any accessible measuring materials not already on hand will need to be ordered.
 - Simone probably is very familiar at this point with brailled math symbols, multiplication tables, and abacus, but a quick review might be helpful. Simone should know that a rectangle is a tangible model, but she should also have an understanding that many classroom floors and walls are also rectangular in shape, so a quick check might be helpful. Time should be spent practicing using and reading all types of braille rulers, both customary and metric, that the student will need to use to do the assignments - measuring lengths big and small. I would emphasize the concept of precision. We could review math terminology and make sure she is able to read the brailled math materials accurately.
 - Measurement- Knowledge of and competency using a braille/large print ruler, yard stick and measuring tape to measure distance.

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- Use a braille ruler to measure cardboard squares or real-world items that are smaller than 1 ft. Discuss centimeters, inches, and feet. Talk about how you can round to the nearest $\frac{1}{2}$ in. or in.
- Talk about distance, have the student count their steps between two locations. Use the braille yard stick to measure the distance and compare. Discuss how many feet are in a yard.
- Use of iPad app [SmartMeasure](#) with VoiceOver to determine distance between two points. Use of trundle-wheel to kinesthetically feel measurable increments.
- Perimeter- Discuss perimeter as being the distance around a shape. Measure each side of the cardboard shapes and add together.
 - Use a string to measure the perimeter of the cardboard shape.
 - Walk around the outside of a building/playground/fence counting your steps, talking about perimeter.
 - Assist the student in making an approximate raised line drawing of the shape you just walked.
 - Allow the student to feel the shape and talk about how to measure the perimeter.
 - Discuss with the student how you could simplify the measurements of each of the sides you walked by dividing each side by the same number. Using the simplified numbers, you can use graph paper to make an exact replica of the shape you walked. (Example- Every 10 steps = 1 square on the graph paper)
 - Using a yard stick and/or measuring tape, show the student how to work with a partner to measure a distance of 10 ft. (example- one holds the end of the measuring tape at the end, using a yard stick you alternate marking the end/beginning point so the stick can be moved, etc.)
- Area- Discuss area, just like we learned you can measure the distance around an object, you can measure the space the object covers or that is enclosed within the shape (surface area). Using the cardboard shapes, use unifix cubes to see how many it takes to cover the shape.
 - Create rectangles on graph paper using Wiki Sticks and count how many squares are inside the shape. Count how many squares are around the perimeter. Compare the numbers.
 - Teach the student the formula for finding Area= Length x Width.
- Review how to access documents on the iPad using VoiceOver. Review and assess the student's ability to retrieve documents on their braille display.
- If they are using new terms (i.e. math or science) I would talk to the student about them and help them learn what the new words mean. Also if they have

An Introduction to Nemeth Code Symbols Used in Grades 2 to 5 and Strategies for Supporting Elementary Students in Building Math Skills: Assignment 2 Answer Key

never used any measurement tools, I would want to have the ones that they would need so they can take the time to explore what the tool is. If there were any questions about the tool, I would teach them how to use the tool before the group work. I would need the worksheets so that the student could explore the worksheet, and if they had any questions on how the worksheet was set up, we could talk about it. If there were any graphs or charts, they should have seen it before the group work.

b. You have reviewed the cloud-based program that will be used and determined it's not very accessible for Simone's current level of technology skills. The teachers are open to alternative suggestions. Describe some modifications or alternatives to this portion of the project, so Simone can still participate in a meaningful way.

- I will need to spend time using the cloud-based program to evaluate it for accessibility and to problem solve where it is lacking. By previewing the program, I should be able to determine possible problems and determine solutions so that the class learning and activities can progress as smoothly as possible. She may need to have access to Wikki Stix, a TactileDoodle, or an E.A.S.Y. InTact Sketchpad. Simone will be working with a group of students, so she will have some assistance from her group. However, it would be very important for me to work one-on-one with Simone with the cloud-based program so that she will be familiar with it, she will know what she needs help with, and what she can do independently.
- Simone can have the information presented on the cloud-based program read aloud to her via a screen-reading program (VoiceOver on iPad), or the document can be downloaded onto her braille display. She will need to know how to convert a print/word document into a brf file.
- If there are questions that she needs to answer, she can enter those directly onto her braille display. If Simone cannot type her part of the presentation as an electronic document, she could write it in braille, and I would interline it for her teachers and her peers to read. That way her peers could include the information she wrote in the group presentation. Simone could also read what she wrote to her peers so they can record what she wrote.
- The supplementary worksheets can be embossed in braille so Simone can access the content in a hard copy. She can then use her braille display to answer the answers.
- Simone can contribute to the presentation of the project by brailleing her portion using her braille display and then sending the document as a Word file to her teacher or classmates.

An Introduction to Nemeth Code Symbols Used in Grades 2 to 5 and Strategies for Supporting Elementary Students in Building Math Skills: Assignment 2 Answer Key

- c. You have the opportunity to consult with Mrs. Iyer and Mr. Gonzales to make a “game plan” on how to support Simone to be successful in a different role during the group project. Discuss what points to address and which products from APH or other sources may be helpful for Simone to be successful during the group project.
- Simone also desires to participate in a different role from note-taker, which is great, so I will need to talk with her teachers to learn what the other roles are so that I can ask Simone which roles she would like to try and determine how to make the roles accessible for her. Perhaps she can rotate roles with her teammates allowing everyone to participate equally.
 - Materials needed: Braille yard stick (APH), Braille Measuring tape 25 ft. (Maxi Aids), Graphic Aid for Math (APH), Wheatley (APH), Draftsman (APH), Braille graph paper, [tactile measuring tape](#), [Sensational Blackboard](#).
 - Simone can work with a partner to measure perimeter. She can assist by holding the end of the yard stick or measuring tape at the start. She would then need to work together with her classmate, following their lead (verbal directions) on when to release the measuring tape or when to walk it in after the measurement has been recorded. She could also be the one to extend the measuring tape by following verbal directions from her partner on when and where to place the measuring tape down. She can use the braille numbers to indicate the distance to her partner who then records the information.
 - If using a yard stick to measure, she can alternate positions at each end of the yard stick by working together with her partner who will assist her in navigating safely each time they switch ends. She can be responsible for remembering how many feet/yards have been counted.
 - Participation in the presentation: Simone could construct a model/diagram of the rooms by using the Braille graph paper, the Draftsman, Wheatley, or the Graphic Aid for Math. Using the measurements collected, she could create a smaller model of the perimeter of the room measured. Examples:
 - Using the Graphic Aid for Math, she could use push pins to mark out each of the corners of the room on the grid. Then using a rubber band, stretch it around the pins to create the perimeter. Each square on the Graphic Aid could represent a yard.
 - Using the Draftsman, she could use a ruler as a straightedge to draw a model of the room measured. In addition, using the braille ruler to measure out each of the sides (1 in. = 1 yd.)

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- In order to support Simone to be successful in a different role, I would recommend the following roles. Simone could be one of the students that measure the walls. She could use a tactile measuring tape or a braille yardstick or meterstick (both available at APH). Or she could be one of the students that does the calculations to find the perimeter and area. She could write her calculations in braille, and I could interline her work for her peers to read. Another role in which Simone could participate is to be one of the students who does the presentation. For this role, she could either memorize her part of the presentation or have it written as an electronic document that she could read using her braille display.
- If she is going to measure the room, we would need to make sure that all obstacles are out of the way, so the student can measure the area without any worries about bumping into something. When I meet with the teacher I would want to know exactly what their expectations are. This way everyone is on the same page, and if the student has reduced work, we can pick out what area the student will need to do. Also have the teachers talk with the students and let them know who is in their group and that they all expect Simone to do her part. Again if there are any measurement tools, I would want to get them in Simone's hands before the start so she has knowledge of her tools. Also I would show the teachers what it would look like on the iPad.