

## **Project INSPIRE Lesson 6 (23:46)**

SPEAKER 1: Welcome to "Pre-Kindergarten-- First Grade Students, Nemeth Code Within UEB Contexts and Strategies for Supporting the Student in Building Math Skills." This is "Lesson Six-- Supporting the Student in Learning Nemeth Code and Math Concepts." The objectives for this lesson are on slide two. They'll be able to describe the importance of pre-teaching Nemeth symbols, locating and use resources for teaching math concepts, and identifying and use hands-on materials and manipulatives to support student learning.

Slide three talks about the importance of pre-teaching Nemeth code symbols and formatting. So, for example, new symbols may include the general omission symbol, tally marks, signs of comparison, signs of operation. And formats may include things such as how to align a spatial problem.

Take a look at the example. We have  $7 - 1 = 6$  in spatial format. You'll be showing your student how the numbers are aligned, that the minus sign is one cell to the left of the widest part of the problem, that the separation line goes one cell to the left and one cell to the right of the widest part of the problem, and that the sum needs to be aligned with the columns in the problem.

So these are important concepts for students, as are centered headings, how we format multiple choice problems, where directions are located, and so on.

Slide four talks about teaching new symbols. We advocate that you consider making flashcards for your student. A good way to make flashcards is to first cut off the top right corner for orientation. And then on the flash card to use dots 2-5, and we recommend to use three cells of these, followed by a space, then whatever math symbol you're teaching, space, and again three cells are dots 2-5. This way, as your student reads across the flash card, their fingers are aligned with the symbol so that they're able to tell the position of the dots in the symbol.

Slide five reminds all of us about the consistency with switch indicators. And I don't know about you, but for me, I want predictability. So when you format your materials, regardless of grade level, you need to make a decision on how you're gonna format those. Are you going to put the opening Nemeth code indicator at the end of lines or directions, or are you gonna put that, for example, on its own line? So make these decisions up front. Also about the one word switch indicator-- are you gonna use that throughout the document or are you gonna write out single words without contractions if you're in Nemeth code?

And for our little people, can we think about the big mouthful of "opening Nemeth code indicator"? I don't know about you, but I even have trouble with that as an adult. So you might want to say "start" or "begin math." And the same thing with the Nemeth code terminator. Might be easier to get in the habit of your student-- think of this as the way that we "stop" or "end math." So pick a term and use it. However, make sure your student does get experience hearing these terms that they will come across in their work.

Slide six talks about the importance of correct finger placement. It's important that our students know which fingers go on which key and that they need to use their thumb for spacing. I love the

way that the teacher for this student used Popsicle sticks to separate the keys to help her with positioning her fingers.

You're also going to want to develop individual memory cues to help your student remember things. Let me show you three examples of what I mean. Slide seven talks about braille the equals sign which takes two cells dots 4-6, 1-3. So we begin by using the two fingers on the right hand then follow with the two fingers on the left hand. And you can see in the picture how the child's fingers are positioned on the keys. It might help your student with the memory cue. Two fingers are equal to two fingers, or you may say two dots are equal to two dots, depending on what makes the most sense to your student.

Slide eight gives you a way to help your student remember how to braille the "greater than" sign, which is dots six, dot 2. So if we begin with two fingers on your right hand, follow with one finger on your left hand. Then we can talk about how you would remember this as two fingers are greater than one finger or two dots are greater than one dot.

And I bet you can guess that slide nine is the "less than" sign which is dot 5, 1-3. So again if we begin with one finger of the right hand and then follow that with two fingers of the left hand, your student can remember that one finger is less than two fingers or one dot is less than two dots. So you and your student together can come up with memory cues that work for the student.

As the teacher of students with visual impairments, it's important that you get to know your student and also make a determination of when pre-teaching the student concepts is important to do for that student's understanding in the general ed math class. Let's hear from Kari, who's a teacher of students with visual impairments, about some of the things that she pre-teaches to her students.

**KARI:** Sometimes it requires with our students that are visually impaired that we do some sort of pre-teaching and post-teaching where we preview the material to them particularly in math seems to be a difficult subject for students that are visually impaired, so we might look ahead of what's coming with the math, introduce any new contractions, braille contractions and symbols that might be involved in that new math. And then after the lesson is taught in the classroom setting, we might spend some time in the resource room practicing that skill a little bit more to make sure that they understand it.

**SPEAKER 1:** On slide 10, you're going to see some materials that you can use to pre-teach abstract concepts. These are all from APH. The first is that Draftsman tactile drawing board. This uses a special film and a stylus. So what you draw with the stylus becomes raised. In the picture, you see a large circle and on the other side of the large circle, you see smaller circles. The teachers ask the student to make each circle in half, and the student has done so accurately with the smaller circles but hasn't done so accurately with the large circle.

APH recently came out with the Tactile Doodle-- very similar to the Draftsman. It's easier to use, and you'll see in the picture that a young student is exploring this circle that she's drawn.

Next we have the five and ten frames. We see a dad looking on as his daughter works with these. On the right 10 frame, she's put six blue circles and is placing the third of three yellow circles.  $6 + 3 = 9$ .

And we also have the individual calendar kit. We see a student who is working in the month of March. He's laid out the different dates for the month of March, and he's going through to find today's date.

Slide 11 focuses on the importance of organization. So our students may use tools such as sorting trays. And we see a student who has one of the APH yellow sorting trays, and it's divided into three sections. They're each labeled. The one on the left is hundreds, the one in the middle is tens, and the one on the right is ones. And you'll notice that the top right corner of those label cards are cut for orientation. And the student is using Digi-Blocks to write a number. So she's working on her tenth.

For your student, besides sorting trays, you might want to consider storage boxes, baskets, thinking about how you're gonna label materials for them. And then also it's helpful for many students if you use a non-slip surface such as rubber shelf liner so that materials don't move.

Slide 12 talks about the importance of building number relationships. And I have three items to talk with you about. The APH hundreds chart is a very valuable tool. It has a yellow background with black numbers in print and Braille numbers. Each square is tactually separated by raised lines. Base 10 blocks are another valuable tool. So we have the hundreds, we have the flats which are the tens, and we have the ones. So those are another tool that are often in classrooms not specifically for visually impaired students but are very helpful. And then 120 chart so that the student can use this to count to 120. So three tools among many that can help students understand number relationships.

Slide 13-- one of our favorites, the hands-on functional activities for visually impaired preschoolers kit available from APH. And it's all packaged up. Therefore you have nice yellow trays that are divided in many different configurations. There's manipulatives and a teacher book. This is a Montessori-based activities curriculum that comes with a guidebook for teachers. So if you're not familiar with Montessori, not to worry.

And we like this quote directly from the APH website. That this product "helps children develop skills such as concentration, hand and visual coordination, ability to complete a cycle of activity, and socialization skills. Also helps develop a sense of order and a positive self-image." I don't want you to think that our tools that are specific for visually impaired students have to be used in isolation. So you can bring other students into activities, and your student can get some benefits from socializing with other children.

On slide 14, we see another helpful tool from APH, the FOCUS in mathematics kit. This is the second edition. This kit has a lot of topics that it covers from numbers and operation, geometry, algebra, measurement, and data analysis, for example. And in the kit, you're going to get a small plastic work tray with dividers along with base 10 blocks that are units, rods, and flats. And

you're also going to get teacher materials in the form of a book. And so we have pictured just some of the many manipulatives that come with this kit.

Slide 15 has APH products for numbers and algebraic reasoning. We have "Feel 'n Peel" stickers for braille numbers zero to 100. Then we have the hundreds board and manipulatives kit. And as you can see in the picture, the student is doing patterning. We have star, circle, triangle, square, and it repeats. These pieces are Velcroed, and there also is a set of pieces that are the numbers. We have consumable hundreds charts shown in the picture, and then one of my all time favorites-- MathBuilders. This is unit one for matching, sorting, and patterning. So lots of manipulatives for your student to use.

Slide 16-- our geometry and graphing products from APH. In the picture, you see the MathBuilders unit six, which is the geometry kit. Has my all time favorite product, the Geometrics. Just love putting those together and having students understand how shapes are made. You'll get lots of great ideas on how to use these and the other products with the MathBuilders unit six in the teacher manual.

Other things available include the "Feel 'n Peel" stickers to the point symbols or stars and the carousel of textures, which is also another "Feel 'n Peel" product. You can use these making tactile graphics. We have a shape board, textured sorting circles and shapes, embossed graph sheets. There's a 10 by 10 grid that are one inches, lots of different graph sheets.

And then another one of my favorite products shown in the picture, the Picture Maker Wheatley Tactile Diagramming kit. So you see the cover of the manual that gives you lots of good ideas. And basically the Wheatley is Velcro pieces that go on a felt board. And we see that these have been used in this case for patterning. So we have square, triangle, square, triangle with the larger pieces, and then there's also a pattern with the smaller pieces. Square, square, circle, square, square, circle. So our student is learning different ways to pattern. We use the Wheatley kit in a lot of different ways.

Slide 17-- we have math drill cards in large print and braille for both addition and subtraction. In the picture, you see the APH divided tray into three sections. And we see the  $- 18 - 9$  equals card in the first section. When the student answers this, if the student gets it correct, the student puts the card in the second section. If the student gets the problem incorrect when flipping over to check work, then the student puts it in the third section. In this way, this helps the student keep organized, and then the student can go back to the cards in the third section and review them.

There's a beautiful picture of a young girl and her father looking at the Quick Pick addition cards. They also have subtraction and other cards as well. The children get to read the problem, place the wooden dowel into the hole to see then if they are correct. We also love the addition and subtraction table.

Let's look at slide 18. That has even more APH products. There's a wonderful game kit that has dice and game tokens so you and your students can make up your own games. We love the graphic art tape for making tactile graphics. You'll never go crooked again with your lines. You can get the puzzle form board kit, the fractional parts of holes which is circles, and then a new

product I have pictured here-- the tactile tangram kit. The teacher manual has lots of great ideas for you.

The materials themselves-- we have a clear Plexiglass board that has the raised black lines for the different shapes and the tangram pieces where the student needs to fit those into the different outlines. Notice that this board is sitting on a no slip mat-- always helpful to help students so that our pieces don't roll around.

Slide 19 is my favorite of the MathBuilders kits when it comes to fractions, mixed numbers, and decimals, and that's kit number seven that you see pictured with the teacher manual and lots of materials, including fractional parts and different pieces that go together to represent values of numbers and decimals.

Slide 20 has some other hands-on materials that are useful for math and science. These are not APH products, so you have to buy them separately. Wikki Stix is a great product, very versatile. So in the picture, out of Wikki Stix a circle, square, and triangle have been made, and the student has cards with these words on them and has to correctly match up the shape name to the actual shape. You can give the child a shape name and have the student use their Wikki Stix to make the shape circle, square, and triangle.

Another great use of Wikki Stix is underlining. So in the picture I have three rows of numbers, and the child has little pieces of Wikki Stix and needs to underline the first number shown when it appears again later in the line. So in the first line, we have the number 22 is first, so the student reads 29, 21, 22, and 20, and has correctly put a piece of Wikki Stick under 22. In the second line, the student is looking for the number 48, and in the third line, the number 35. We have a very bright student who has underlined all numbers properly.

Digi-Block Store has the Classic Block-of-100 and the Power Block-of-100. And we see in the picture that a student is using Digi-Blocks to form a number, and she's doing this on an APH tray with the two dividers.

Slide 21-- our hands on materials and manipulatives for math and science-- lots more. We have the Math Window. So you'll see a picture of the full Math Window. We happen to have a multiplication problem here. Obviously, our young students aren't doing multiplication.

One way you can use the Math Window as shown in the other picture is giving the student math problems that they need to solve and having them set those up and work them on the Math Window. So our students in the process of setting up three basic spatial problems and have used the magnetic pieces to set up the problems. Next is going for the separation lines, and then we'll add up the answers.

We love the Teddy bear Counters and Unifix Cubes and other things that you get in Didax. And then E.A.S.Y. LLC has the inTACT sketch pad. You'll notice on my sketch pad, I've drawn a circle, a small square, a triangle, and a rectangle. So I might be asking the child to find which is the smallest shape, or I might be asking the child to show me where the triangle is.

Slide 22-- talks about the Pearson Nemeth Braille Code Curriculum, and this is a curriculum that Drs. Tina Herzberg, Susan Osterhaus, and Sara Larkin have developed. It's available from Pearson. It teaches the student to read and write Nemeth code within UEB context. Currently, there is a pre-kindergarten, kindergarten, first, and second grade set of materials. It's important for you to know that the materials are aligned with the Common Core standards and that these are really set up to be hands on and fun. So they include the teacher's scripts, braille-ready files for the student worksheets, answer keys, data recording sheets, review activities, and assessments. So when you go to the website, you'll be able to download zip files for each level, and you'll have everything you need.

So in that curriculum, there are lots of materials. So for example, these are not all of them by far. Place value charts, a template for making bingo cards, a template for your own five and ten frames, mazes, and I'll show you one in just a minute. Connect Four games, flash cards, a button to find the path activity we'll look at, a game for rolling and racing, shape activity, "What Am I" activity, and a counting to 100 chart that we'll take a look at as well.

So let's look at some of these materials. From the pre-kindergarten curriculum, we can build a train. And so they give you directions for how to do this. You're gonna need to get your materials which are foam stickers, craft sticks, and then make flashcards labeled one to seven. Be very easy to add print to these flashcards so your student who's a braille reader can do this activity with somebody who's a print reader.

So the student will shuffle these flash cards and then pick a card, and using the phone stickers and the Popsicle stick or the craft stick if you want to call it that, the student is gonna make their train. And then they can go around and race that train. So that's a fun way that you can practice counting concepts as they put these foam stickers onto the crafts stick.

All right, slide 25 is a kindergarten activity. This one focuses on tens and ones. So the student has a flash card. In this case, the flash card reads 25. Again, we have that lead-in line of braille cells, space, the 25, and the lead-out line. And for fun, this time we used four cells in the leading and the lead-out line. The worksheet that you can emboss has a column for tens on the left and a column for ones on the right with a braille line going between the two columns. And the student uses their Digi-Blocks to make the number on the card that they've picked.

Slide 26 is the maze from the kindergarten curriculum. So the student starts up at the top left and goes through the maze. And as the student gets to each square, the student has to read the problem. And then when they get the answer, they're able to move through the maze to the next square. OK? Now this could be a race, OK? You and your student could race each other. your student can race their time from one day, let's say Monday, and see how they do on Friday. Have they gotten any faster knowing their math facts?

Another kindergarten activity is to rebuild a hundreds chart. So this hundreds chart has been cut apart into different chunks. And the idea is that you give the student the chunks all mixed up, and the student has to assemble this hundreds chart to put it back together so that the numbers are in order from one to 100.

OK, this is the first grade "Find the Path" activity on slide 28. And so we have the student having to be a pilot. And Nemeth begins with math problems. So the students go in to answer these math problems. And when the student gets down to the end, the student has to make an airplane.

So we have left room for the student to make an airplane. And here comes mine! I used my braille writer to make my airplane. Your student could use tactile materials, foam, felt, and other materials to make their airplane, but we left room for the student to make an airplane.

And my last sheet is the first grade-- determine the shape and then write the missing numbers. So I have the numbers from one to 20, but some of them are missing with general omission symbols. So the first thing a student needs to do is find those general omission symbols and determine what shape they represent. And if you'll see I have a green rectangle around the first missing shape that I found.

And then I go along, I read my numbers, and OK, I come to more general omission symbols down in the bottom left. What numbers the student has to determine is missing and what shape do they have. Again, another rectangle. So the student can then write out these numbers from one to 120, including the actual numbers and not the general omission symbol.

So just a few ideas from the Pearson curriculum to get you going. I hope you'll download it and begin to use the materials in there, that you'll go back and revisit your APH catalog if you haven't done so in a while, and that you'll share these resources with general education teachers.