Project INSPIRE Course 7 Lesson 1

SPEAKER: Welcome to "An Introduction to UEB Math/Science for Pre-Kindergarten - First Grade Students and Strategies for Supporting Math Learning." This is Lesson 1: Numbers and Linear Problems. Slide 2 has the objectives for Lesson 1. You are going to be able to read and write the following UEB symbols: numbers 0 to 120, comma, plus and minus signs, equal sign, less than sign, and greater than sign, and you're going to learn the visible space and question mark used as an omission symbol in mathematical expressions. You're also going to learn how to number math problems, and read and write simple math problems.

So let's get started on slide 3. UEB math/science has been with us for quite a while. As of January 4, 2016 the United States transitioned to the Unified English Braille code, which we'll call UEB. Now, UEB has been approved by the Braille Authority of North America, referred to as BANA, and it's really important that we recognize that UEB truly is a complete code, folks, so it includes math and science material. So we can do everything from what our students need in their reading and writing instruction to what they need in their math and science instruction using UEB.

Now, in the United States, we like to call things by different names. So you may hear the part of the UEB code that references what students need in math and science referred to as UEB Math/Science, or you may hear it referred to as UEB Technical, but please keep in mind it is a complete code, and when we say the term UEB Math/Science, or we say the term UEB Technical, we're referring to the symbols that our students are going to be using when they're in math and science classes.

Let's go on to slide 4 and talk about some resources available, both from the international Council of English Braille, ICEB, and/or from BANA, the Braille Authority of North America. So the first one is The Rules of Unified English Braille, 2nd Edition that was put out in 2013. A second resource is Unified English Braille Guidance for Technical Materials that initially was put out in 2014.

I want to point out that right now, ICEB is working on a second edition here in July of 2023, and they've been working on this for a while, so even Section 3 was updated in 2018, and that's the section that talks about signs of operation and comparison. It's really important, folks, that you bookmark these sites, ICEB and Braille Authority of North America, and that you go back periodically and check for updates and changes. Another important document that you should have in your arsenal is Provisional Guidance on Transcribing Mathematics in UEB, and the current version of that is a 2019 document.

Let's go on to slide 5. We're going to jump in, and I know you know your numbers, and I know that how to braille numbers using the upper part of the cell. So a big difference with UEB Math/Science and Nemeth is our numbers in UEB Math/Science are in the upper part of the cell. So you're going to use that numeric indicator-- dots 3, 4, 5, 6-- and you're going to use that when you write a number. So, for example, if I was going to write the number 14, I would do my numeric indicator, dots 3, 4, 5, 6-- my 1, which is dot 1, and my 4, which is dots 1, 4, 5.

Slide 6, I want you to practice, and even if you folks are using braille daily, it's always good to do a little practice. So I want you to interline the following numbers. You can do it for me here in Activity 1A on slide 6. When you're ready, come on back. We'll check your answers on slide 7.

OK, slide 7 is the answer key to Activity 1A. Make sure that you interlined all those numbers properly. Let's go on to slide 8. I want you to practice brailling the numbers, and I want you to braille them the way I have them shown below. So go ahead and pause and do Activity 1B for me.

Slide 9, check your answers for me for Activity 1B. Did you braille everything? Are you like me and you sometimes get that 4 and that 6 confused or that 9 and that 5? We need to be accurate, folks, if we want our students to have accurately prepared braille and if we want their teachers to have anything we interline that's accurate. So check your accuracy. It's always good to do a little practicing, so glad you took the time to do Activity 1B.

Let's move on to slide 10 and talk about the comma. If you write several numbers in a row, you're going to, obviously, separate them by a comma, and in UEB, our comma is dot 2. We're going to put it immediately after each number, and then put the space. So there's never a space after a number and then the comma just hanging out there. No. No. No.

So if I have 7 comma 8 comma 9, I'm going to braille it as numeric indicator 7, and remember that 7 is in the upper part of the cell, comma, which is dot 2, space, numeric indicator, 8, my comma, dot 2 again, space, and then my 9.

My second example is 110 comma 111 comma 112. So again, I'm going to write that making sure I put a space after my comma. So numeric indicator 110, dot 2 for my comma, space, numeric indicator to start my 111, comma, space, and then numeric indicator starting my 112. So remember, there's a space after a comma if my comma is with a number.

Slide 11, I want you to do Activity 1C: Braille the following as shown below. And you'll see I have four lines of numbers with commas. When you're ready, come on back.

Slide 12 is your answer key to Activity 1C. Make sure, obviously, that you brailled your numbers properly and that you put a space after each of your commas.

Slide 13 goes on to signs of operations and signs of comparison. So I'm going to talk about five signs here, and make sure that we know their names because there's different rules for signs of operation. In this case, when we're talking about the addition sign, it takes two cells to braille addition. In UEB Math/Science, the first cell is dot 5, the second cell is dots 2, 3, 5. It also takes two cells to braille the minus sign, so it's dot 5 in the first cell and 3, 6 in the second cell.

Signs of comparison, and we'll talk about spacing with these in just a moment. But all our signs of comparison that we're doing in this lesson, use two cells. So our equal sign, dot 5 and then 2, 3, 5, 6 are

"less than" sign, takes two cells. Its dot 4, 1, 2, 6. And our "greater than" sign also takes two cells, dot 4, 3, 4, 5.

All right, let's take a look at some problems on slide 14, where we're going to show you how to write these problems using the addition, the subtraction, the equals, the less than, and the greater than signs. In UEB Math/Science, we always use a numeric indicator with the number, no matter where it is positioned in the math problem. There's typically no space on either side of the operation signs, in this case, the addition and the subtraction. We'll get into some other rules later on in this course, but for the examples I'm going to go over with you now, whether in print, there is a space or not, on either side of the addition or minus sign in print, in braille, there is no space.

However, always, always, always, there is a space on either side of the sign of comparison. So my first problem in print says 45 minus 25 equals 20. Visually, there is no space between the 45 and the minus and the 25. The way I'm going to braille that problem is numeric indicator 45, my minus sign, which is dot 5, 3, 6, numeric indicator 25, space, my equal sign, dot 5, 2, 3, 5 6, space, and my numeric indicator 20. So notice all three of the numbers have a numeric indicator in front of them.

My second problem in print, you'll notice 89 plus 6, there's a space on either side of the addition sign. From the braille perspective, there's no change. So my problem is 89 plus 6 equals 95, going to be given the numeric indicator, 89, my plus sign dot 5, 2, 3, 5, numeric indicator beginning my 6, space, my equal sign, dot 5, 2, 3, 5, 6, space, and then my 95. Again, that 95, of course, begins with the numeric indicator. Folks, numbers begin with numeric indicators, so I'm not going to keep telling you numeric indicator, because we all know that our numbers here need a numeric indicator.

That third problem I have in my examples is 100 plus 11 is less than 120. Notice for my print version that there's no space on either side of the plus sign. Again, this doesn't make a difference in braille, but I want you to recognize that it doesn't matter how we're spacing the print in these problems that with that sign of operation, I'm going to do the same in braille. So I'm going to do 100, plus, dot 5, 2, 3 5, 11, space, less than, which is dot 4, dots 1, 2, 6, space, 120.

Last problem is 68 minus 54 is greater than 12. So I start out brailling my 68, dot 5, 3, 6, for my minus sign, 54 space, and then my greater than sign, dot 4, dots 3, 4, 5, space, and my 12. Not hard, is it? Let's go on to slide 15 and talk about how we number problems. So when you're numbering a problem, you're going to use a period when numbering simple problems that have a period in print. So we're basically, folks, doing what we normally do. We follow the imprint, and of course, our period, as you know, is dots 2, 5, 6.

When we're giving our pre-kindergarten, kindergarten, and first grade students their math type of problems, we're going to begin in cell 1. So I have two examples here. In my first problem, I have problem 1, 5 minus 2 equals 3. So I'm going to begin with 1 period, space, then I've got my math problem. I've got five-- that minus sign, remember, is dot 5, 3, 6, 2, don't forget that numeric indicator, friends-- space, and that equal sign, which takes two cells, dot 5, 2, 3, 5, 6, space, and then 3.

My second problem reads 4 plus 7 equals 11, so same pattern. I'm going to begin with my 2, put my period, dots 2, 5, 6, space, 4, in this case, my plus sign, dot 5, 2, 3, 5, 7, space, my equal sign again, dot 5, 2, 3, 5, 6, space, and my 11.

Slide 16 talks about the visible space and the question mark as a sign of omission. So often, for our young students, there's either a space where they need to write in a sign of operation, a sign of comparison, or a number, or there's a question mark where they're expected to fill in that information. In print, that showing omission can be done both of these ways.

We do make a distinction in braille, so our question mark, as you know, is dots 2, 3, 6. The symbol for a visible space, when a space has been left because the student needs to fill in something, the visible space symbol is dots 3, 4, 6.

Now, we use that visible space symbol for a blank space in print with one exception: when the answer to the problem is left blank. So if you look at four example problems below, we'll go through them, and we'll look at whether we're using a question mark or whether we're using a visible space or whether we have a blank where the student is going to give the answer and there is no visible space.

All right, first problem, 8 question mark 2 equals 10. Boy, I gotta get my little math hat on here. I think that's a plus sign. My gosh, I'm right. So I've got numeric indicator 8, then I'm going to put that question mark smack in there, folks, where the plus sign would be, dots 2, 3, 6, and then I've got my 2 and I continue on with my problem, space, equals space 10.

My next example is 14 comma 15 comma question mark comma 17. So obviously, we want the student to fill in 16 where the question mark is, so I'm going to braille 14 comma-- remember, comma is a dot 2-- space, 15, comma, space, question mark, comma, space 17. So the student knows that is a question mark-- that 2, 3, 6-- and they're expected to fill in what's missing. What is that question mark representing? In this case, 16.

My third example is 7 minus 2 equals. We want the student to write in the number 5, so we have a blank here that's just out there. It's represented with nothing written, but after the equal sign, the student is supposed to put the answer. So that is exactly what we're going to do. We're going to braille it the exact way it is. 7, the minus sign-- that 5, 3, 6-- the 2, space, equals, and that's it.

But in my next example, I have 1, then there's nothing there. It's a blank space. 3 equals 4. We, obviously, want the child to fill in a plus sign. We need to tell the student that there is a space there that is requiring something, that is representing something that's missing. So in this case, we're going to do 1, my visible space-- dots 3, 4, 6-- my 3, it's all together, space, my equal sign, space 4. So why don't you really pay attention to that fourth example, and make sure you're clear how to use the visible space in that fourth example and that question mark in the first example and second example.

All right, when you're ready, make sure you understand all this. Let's go on to slide 17 and talk about the Grade 1 indicator. So the Grade 1 indicator is dots 5, 6, and we're going to use the Grade 1 indicator when we want to make sure that the student doesn't get confused because there's a question mark standing alone. Now, you're saying to me, "But Narrator, we just looked add a question mark, and there was no Grade 1 indicator."

Remember, if you want to go back and look, that on slide 16, that question mark was followed by a comma. I'm talking about in my example problem here, for example, problem 1, 5 plus 5 equals question mark. Do you see how that question mark is standing alone? This is where, gang, I'm going to need my Grade 1 indicator.

So let's look at that problem, 1 period, space, 5 plus 5, space, equals, space, dots 5, 6, Grade 1 indicator, and then that question mark dot 2, 3, 6. So when I have a question mark standing alone, for omission, I'm going to use the Grade 1 indicator to avoid any confusion and make it very clear this is a question mark. My next example is problem 35. 6 question mark 10 12. OK. Oh, I get you, my student needs to fill in 8. But you know what, I need to let them figure that out. I need to show them that question mark is asking them to come up with something that goes in there. So I'm going to braille 35 period, 6, space, question mark. Well, it's a stand alone question mark, gang, so I'm going to put my Grade 1 indicator in front of it-- dots 5, 6-- space, 10 12. Your narrator is very happy today that she can do first grade math.

All right. We're getting ready to wrap up here with Activity 1D for you to interline here on slide 18. So please go ahead and pause, interline the problems that we have here for you, and when you're ready, come on back.

All right, slide 19 is the answer key to Activity 1D. Check your work. Did you number your problems properly? Got all those numeric indicators where they belong? Did you get your commas, your visible spaces, your question marks? Make sure you got it all down, and if you do, well then, folks, you are done with our Lesson 1, and you're ready to go on to Lesson 2. Thank you so much.