Project_INSPIRE_Course_2_Grades_2-5_Lesson 4

SPEAKER: Welcome to Grades 2 to 5 Nemeth Code Symbols for Fractions and Spatial Problems, Instructional Tools, Materials, and Technology. This is "Lesson 4, Formatting Spatial Materials and Number Lines for Students in Grades 2 to 5."

Slide 2 has the objectives. You're going to be able to locate and use formatting resources. And then you're going to be able to format five things: directions, transcriber notes, example problems, numbered spatial problems, and numbered lines.

Slide 3 gives you some BANA Terminology. BANA, the Braille Authority of North America, and we're going to go over some of their resources in a moment. But there's five terms they use that don't quite align with terms that the general public uses.

For example, they call a title a centered heading. An exercise is the term used for a set of problems. Instructions are the term that they use for directions.

Now, runover is an important concept. With runover, after you braille your first line, runover refers to where you start your second, or subsequent lines. And this could be in a paragraph, it also could be for a set of problems.

And then the transcriber's note is a term that we use to, as I like to think of it, whisper to the braille reader. To tell them information that's not shown in print, but that we've included with the braille. And we'll go over that in just a moment.

But first on slide 4, let's begin to talk about the resources. The first resource we want you to be aware of is the Guidance for Transcription Using the Nemeth Code withing the UEB Contexts. This document is available from the BANA websites of the brailleauthority.org. I think of this as my little Bible on how to do Nemeth Code within UEB contexts and I carry it everywhere I go.

You can get information about spatial problems on page 10, and information about the number lines on page 14. Now slide 5 is about Braille Formats: Principles of Print-to-Braille, another important document. I do not carry this one around with me, it's pretty big.

We often refer to this as "Braille Formats." Again, it's available from BANA, and specifically section 3 ties to this lesson where it has some examples of transcriber's notes. So definitely bookmark it, don't carry it.

Another resource to use is An Introduction to Braille Mathematics Using Nemeth Code within UEB Contexts. So, this is developed by NFB, the National Federation of the Blind. Lesson 10 specifically has examples of spatial problems for addition and subtraction, and Lessons 12 to 13 have examples of spatial arrangements for multiplication and division.

Lots and lots of great information in this document, which is actually a series of lessons.

On slide 7 we've got the Guidelines and Standards for Tactile Graphics, another BANA document that you want to bookmark. Unit 5 and 6 have information about how to create tactile graphics. And we have examples there of number lines both in print and SimBraille, and it's helpful to see them side by side.

You also can get the supplement that provides examples in braille, including a number line created as a tactile graphic for younger students. So, the supplement is a separate document that you can get.

On to slide 8, let's get down to the whole idea of formatting. And I just want to go over some basic formatting for students in Grade 2 to 5. First, we are now in second grade, so we're ready to single-space materials. BANA refers to titles, as I said, as "centered headings" and we're going to go through that here in just a moment.

But when you have a centered heading, or the title of a worksheet, it goes on the first line of the page and always leave a blank line following it. You're going to follow the print for how you're going to do any problems on your page punctuation, capitalization, so our job is to give our braille reader access to the print.

So, you do not change the directions or the problems. This is where you use that transcriber's note to whisper to the student if you need to tell them something about those directions or problems. But you just don't go off randomly changing them.

Alright. Slide 9. Let's make sure that we understand how a spatial problem set looks, and what is our directions. Obviously, it's Add or Subtract, period, here at the top. So, those are directions.

And then our number problems which remember, BANA would refer to as exercises, come below those directions. When I think about how am I going to set this up for my braille reader, I'm going to begin those directions in cell five. I'm going to put the opening Nemeth indicator on the same line as the directions.

And notice my 4-5-6, 1-4-6 at the end of that line that says Add or Subtract. My print is followed for the problems, so I'm not going to all of a sudden start putting these problems into linear problems, because they're spatial problems; they're spatial arrangements.

So, look at how I did problems 35, 36, 37, and 38. Do you notice that my numeric indicator, 35, period begins in cell one; that there's a blank line above and below my spatial problems, because this is a requirement?

And that I've left one or two cells to either side of the separation line.

I want you to pay close attention. Where did I put my Nemeth Code terminator? In this case, I'm done with the page. So, I've opened Nemeth. I need to close Nemeth.

I've put it starting in cell one so 4-5-6, 1-5-6 to Nemeth terminate. Obviously, if I had more Nemeth that followed my spatial problems, I wouldn't terminate until I finish that Nemeth.

Alright, here we go on slide 11. Let's look at the anatomy of a worksheet with examples. So first I have my bolded title, and I want to talk about that in just a moment that bolding.

Next, I have my directions. So those directions read, "Show your work and watch the signs carefully!" Ah, I've got an example problem. Example: two-fourths plus one-fourth equals 2 plus 1 over 4, which equals three-fourths.

And then well, what do I have? I've got those numbered problems or exercises. So, make sure you recognize all the parts of this worksheet before we go on and we look at how do you actually braille this.

Let's go ahead and go on to slide 12. The first thing I'm going to do is my title, or my centered heading. I'm going to delete the bold because it's not there for meaning. So I'm going to center my heading, "Fun with Fractions," followed by a blank line.

Now I'm going to braille my directions. Directions are brailled beginning in cell 5 with runover in cell 3. So, go ahead and check to make sure that I did my directions properly. After the directions, I leave a blank line and I'm going to braille my example.

You always leave a blank line above and below an example. So, I braille example, colon, and then I'm going to go ahead and open up Nemeth because I have my example problem of two-fourths plus one-fourth equals 2 plus 1 over 4, which equals three-fourths.

Notice that my example is brailled in 1, 3 formatting which is the same way I would braille my problems. After the example, I leave a blank line. I braille my problems, and when I get to the end of the page, I'm going to go ahead and put my Nemeth terminator.

I want to point out one thing. So, let's go back and look at the example, did you notice that I had to divide my example between the two lines? It's always important when you divide a problem, whether it's an example, or it's just a problem, that you do so at the sign of comparison.

Also notice with the example, that I did not actually bold and underline the word "example." When you have that word example, followed by a colon, you're not going to use any type of change indicator.

Let's go ahead and go on to slide 13, and we're going to talk about transcriber's notes. Now I think of transcriber's notes as a way to provide the braille reader with information.

So, what are my different directions, or how are they going to get the information about something that is colored, and the color has meaning? How do I open a transcriber's note?

It takes me three cells. Dot 4, dot 4-6, dot 1-2-6. When the braille reader sees that open transcriber's note indicator, they understand that now you've deviated from the print.

When you end your transcriber's note to let them know, hey we're going back to the print, you're going to use the closing transcriber's note indicator. Dot 4, dot 4-6, dots 3-4-5.

You do not write a novel, folks, with a transcriber's note. You're brief. Give them what they need, and give it to them quickly. When you go to format your transcriber's note, you're actually going to start in cell 7. So that opening transcriber's note symbol starts in cell 7, and if you have runover, it begins in cell 5.

So, let's go on to slide 14 and see if we can figure out how this all works. Now I've taken that same worksheet we just looked at, the "Fun with Fractions" worksheet, but I need to tell the braille reader I want to let you know to write your answers on another piece of paper.

So, let's go back up to the top. We need to see, yep, centered heading, got that. Blank line, got that. Directions starting in cell 5 with runover in cell 3, got that.

Right underneath those directions, do you see how I started in cell 7 with my open transcriber's note, then I just go right into it. So, there's no space between the open transcriber's note numbered indicator and where I start my note.

So, I wrote it out here. "Write your answer on," I went to the next line. My formatting is 7, 5 so my runover begins in 5 with "another piece of paper." And after that period, right away in to that closing transcriber's indicator. Then I just went on with the example and the problems as we discussed previously.

Slide 15. It's time to put you to work. You need to decide if each statement is true or false. When you're ready, please come back and check your work.

Alright. On slide 16 we have answers to the first four questions, the true and false. Check your work.

And on slide 17, we have the answers to questions five and six, so make sure you've got it right. And when you're ready, we're going to go ahead and go on to slide 18.

So on slide 18, we're going to talk about number lines for young students. And by young students here, I mean students who are below fourth grade. When we're doing a number line for children in third grade or younger, we're going to create these as tactile graphics and we're only going to braille the labels.

So I have a number line that's been created as A, B, C, D, E, F as points on that number line and below it has 0, 5, 10, 15, and 20. Notice how I have tick marks of those lines going up and down for representing the numbers 1, 2, 3, 4, for example.

I have used thermoform in this case to create a tactual representation of this visual number line. Notice that my points of A, B, C, D, and E, and F, that there is no English letter indicator, or letter sign. On the number line we know that those are letters.

Notice that with the numbers below the line, there is no numeric indicator: 0, 5, 10, 15, and 20. So this is a tactile representation of a number line that I would use with students in third grade or below.

Now what happens when we get to fourth grade? Well on slide 19, we're going to tell you that you can prepare them in braille. If you are using symbols, you want to let the student know what those symbols stands for.

So, you may have a special symbol page if you're doing a book, or a transcriber's note when the student is first learning those symbols so they understand how things are represented on a number line.

We are going to always transcribe our number lines in Nemeth Code. And I just have an example down at the bottom of the page. So we all know what a number line is. So we've got our left and right-pointing arrows, and our numbers of 100, 110, 120, 130 and 140 and we have our tick marks, or scale marks, indicating where 105, 115, 125, and 135 are.

I'm sure you know what a number line is, but I felt compelled to go over that with you.

Slide 20. Let's figure out how these symbols work in braille. So that left-pointing arrow actually looks like a left-pointing arrow, its dots 2-4-6. The line that goes across between the arrows is actually called an axis line. I'll just call it a line, and you represent that with dots 2-5.

The scale, or tick marks, we're going to use dots 1-2-3-5 and that right-pointing arrow, it's fun it looks just like a right-pointing arrow: that's 1-3-5. Alright, so you've got your symbols here on slide 20, let's put it into action on slide 21 by talking about, well what are the rules about brailling a number line.

The units on the number line must be equally spaced. So this is really important. We want those numbers on the number line to be equally spaced, so that our students get the concept. Those scale or tick marks are labeled below the number line. No matter what happens in print, we're going to do it here in braille.

We are definitely going to never include numeric indicators on the numbers on our number line. And those tick marks line up with the first digit of the numeric label. So, if I'm brailling 117 underneath a tick mark, the one for the hundreds in 117, is going to go right underneath the tick mark.

If I have a number that has a minus or a plus sign in front of it, I'm going to still line up the first digit, or the opening fraction indicator with the tick mark. And I'll show you some examples. So, let's go on to slide 22 where I have that number line I showed you a little while ago that has 100, 110, 120, 130, and 140 labeled, but also has tick marks indicating the fives.

So begin with my left-pointing arrow, dots 2-4-6, notice how my line, my axis line, it's two spaces between each tick mark and the left- and right-pointing arrows. Look how evenly I have spaced my number line. Notice that those tick marks or scale marks are dots 1-2-3-5 and you see how all my numbers, the 100, the 110, the 120, the 130, line up right underneath that first digit, that hundreds digit lines up right underneath the tick mark.

Let's go on to slide 23 and look at an example of a number line worksheet in print. Very important, our number lines are always preceded and followed by a blank line, so blank line above, and a blank line below.

If my number line comes after UEB, or is followed by UEB, it's going to be very important that I remember to use my Nemeth Code switch indicators because hey, number lines are Nemeth code. Now this print worksheet has the cutest elephant in the world. Oh my gosh! What a cute elephant with a nice little elephant-y smile.

Am I going to include this for my braille reader? No. Gang this is just what I call "visual fluff." That's your narrator's term. We don't need to include the cute little drawings. You are not going to sit there and make a tactile graphic of an elephant. It's there just to visually appeal to our students. So, just a reminder about that.

Alright. Let's go on to slide 24 and look at how we did this number line worksheet. So again, I start out with my centered title, number line, subtraction, blank line underneath, directions 5, 3, open Nemeth indicator at the end of the directions. I leave a blank line because a blank line always goes above and below a number line.

Now I'm brailling my number line, which goes 10, 11, 12, 13, all the way up to 20. That's pretty easy. In this case again, I happened to put two cells between the scale marks or tick marks. It could have been three cells if it was all going to fit on the line. The important thing is that I'm consistent.

Notice my right and left arrows, rather my left and right arrows, because we work from left to right, don't we. So that left arrow is dots 2-4-6, and that right pointing arrow is dots 1-3-5. Blank line underneath the number line, and then I have problems 1, 2, and 3 in spatial format which we've gone over previously.

On to slide 25. Sometimes we have a solid filled-in circle to indicate a point on the number line. No problem in braille. We're going to use the full cell to represent that. So I have two example number lines. The first number line reads: negative one-half, 0, one-half, and 1.

And I filled in circles at negative one-half, and at one-half. So I begin with my left-pointing arrow, I start my axis line, dots 2-5, and then I get to my first tick mark. I have to put six cells of dots 2-5 that line before my next tick mark so that everything gets spaced appropriately.

Now let's look at how I've brailled negative one-half. I start the negative sign one cell to the left of the tick mark. So the tick mark is lined up with the opening fraction indicator in negative one-half. And then I braille my 0 underneath that second tick mark. Under the third tick mark, I'm going to have my opening fraction indicator for one half, and then under the fourth tick mark I have the 1. How do I do the filled in circles? That's my full cell, so notice that I have one above the negative one half, and one above the one half.

And of course when I get to the end of my number line, I used dots 1-3-5 for that right-pointing arrow so that my braille reader knows that, that number line goes on to infinity. The second

example down at the bottom, my number line is using decimals, so: 0, 0.5, 1, 1.5, 2, 2.5. I've got three circles at least. 0.5, 1.5, and 2.5.

So same format showing you start up with my left-pointing arrow, I start my axis line, I do my first tick mark. This time I'm doing four cells between tick marks. And I go 0, 0.5, 1, 1.5, 2, 2.5.

And those full circles right above the 0, and the 0.5, the 1, and the 1.5, and the 2, and the 2.5.

Alright, let's go on to slide 26, and it's your turn. Activity 4B, need you to interline this worksheet, please. When you're ready, come on back.

Slide 27 has the answer key for Activity 4B. When you wrote out your title, you probably didn't put it in blue, and that's fine. It's not about the color. Did you go ahead and write the problem properly, and write out the number line so it accurately is represented for the braille reader? Check your work.

When you're ready, let's go ahead and go on to slide 28. This time you're going to do Activity 4C and you're going to transcribe the worksheet in braille. So please go ahead and do that, and when you're ready, you can check your work.

I had to break the answer key for Activity 4C across slides 29 and 30, so go ahead and check the top half of the answer key. And now we'll go on to slide 30 and you can check the bottom half of the answer key. Did you braille those problems properly, and did you make sure you terminated Nemeth?

If you didn't get something accurately, please go back and review this section of this lesson. It contains that information.

Congratulations! You made it through the fourth lesson in this course. We're going to put the actual producing braille aside as we move into lesson five and start to talk about materials and strategies for working with your student with spatial problems and fractions and decimals at the second to fifth grade level.

So thanks for taking part in lesson four, and we'll see you for lesson five.