PROJECT INSPIRE
GRADES 2 TO 5: NEMETH CODE SYMBOLS FOR FRACTIONS AND SPATIAL PROBLEMS
Example Lesson from Danielle Cummings, Prescott Arizona

Scenario 1: Haro is a 3rd grader at Manchester Elementary School. He has strong braille skills and uses Nemeth Code within UEB context. He is learning about fractions in his math class. Next week, Haro will participate in an Orientation & Mobility (O&M) lesson at his local convenience store. He will be purchasing up to $2.00 worth of products. These will be shared with others in order to reinforce the concept of fractional parts. He will be walking from his home to the store 3 blocks away, accompanied by his O&M specialist, Mr. York. You have had successful collaborative lessons with Mr. York in the past.

1. What information can you share with Mr. York about the math concepts, including about fractions and money, that could be embedded in this lesson?

Email to Mr. York:
Hello Mr. York,
Haro has been working on fractions in his math class and since you will be taking him to a convenience store this week for his lesson. I am hoping you can incorporate some of his math concepts into your lesson.

We discussed previously that you made a tactile map of his 3 block route to the store with the PIAF and reviewed it with him. I appreciate that you made 2 copies of the map since we have also been using it in class to discuss fractions.

Since there are 3 blocks in your route can you please stop at each block and ask him what fraction of the route he has completed? For example: after the first block, say "Haro, we will be walking 3 blocks total. We have walked one block out of the three blocks we will be traveling." Then ask "Haro, what fraction of our route have we completed?" I am hoping he will answer 'one third'. He may need to refer to the tactile map. Please ask at the second and third block as well. At the last block, when you have reached the store, he may say 'three thirds'. If he does, ask him if there is another way he can say that. Hopefully he will answer 'one whole' as we have been working on this a lot in class. If possible, please repeat these questions on the way back with less prompting and let me know how he does with these questions.

When in the store, please incorporate fractions into the discussion of his money and what he can buy. In class we have discussed the different ways to make $2 with different coins. For example, he knows that 4 quarters make $1 and 8 quarters make 2 wholes or $2. We have done the Nemeth problems ¼ +¼ + ¼ +¼ = 1 and 0.25 + 0.25 + 0.25 + 0.25 = 1. We have also discussed concepts such as 8/4 = 2 and he has a good grasp that this fraction is the same as 'eight quarters equals $2'.

I am familiar with this store and I know they have a $0.25 and a $0.50 candy bins. If this candy interests him, please do some quick checks with him. For example: if he has 2 pieces of candy

from the 25 cent bin and 2 pieces from the 50 cent bin, ask him "What fraction of your total $2 does this candy represent and how much do you have left?" You may need to walk him through the first problem. Based on my experience with him in class, this is hopefully how he will answer, "The 2 from the 25 cent bin are ¼ + ¼ and the 2 from the 50 cent bin is ½ + ½." At this point he may need a prompt to add them all up. You could say, "what part of the whole are the 2 from the 25 cent bin?" He will most likely say, "one-quarter plus one-quarter is one half" Encourage him to keep going with the 2 from the 50 cent bin, "what part of the whole are the 2 from the 50 cent bin?" He may answer, "one-half plus one-half is a whole". You can then tie it together with questions like "What fraction is all of your candy of the whole ($2)?" Or, "how much money have you spent with what you picked out?

If he picks out something else that is $1.10 or $1.15, you can use the same question but adjust it into 10 parts or 20 parts respectively. For example: If he picks out something that costs $0.70 you can ask how many dimes make up $2 then follow up with how many dimes he has left.

When he has his next math class, we will be discussing this as well.

I understand that you will be on-the-go so I wrote you a list of these questions (without answers because I am not sure what he will pick) for your reference.

On the walk to the store and return trip after each block:
"Haro, what fraction of our route have we completed?"

At the store:
"What fraction of your total $2 does this item represent?"
"How much do you have left?"
"How much money have you spent with what you picked out?"

2. What math related materials or tools would you recommend Haro bring with him?

In class, I went over the concepts of fractions using tactile 'tens frames' and made an 8 block one using a PIAF machine.

The problems we have discussed look like this with the 4/8ths in Nemeth and the yellow shade is a filled in square:
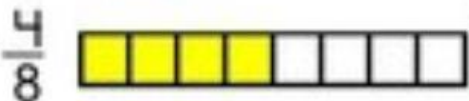
He understands that this could be 4 quarters out of 8 total quarters. He also understands that this is $1 out of $2. He has also done problems such as $1.25 fills in 5 of the squares and that he would then have 3-quarters or $1.25 left.

The one I made is big enough for each square to hold an actual quarter coin. He could bring the paper with the tactile 8-frame and put the quarters in the frame as he picks out his candy. The tens-frame can be used if he picks out something that needs dimes and the twenty-frame for items with nickels.

3. What would your pre-teaching prior to the lesson look like? What would you do for a follow-up? Keep the following in mind: math concepts, using Nemeth within UEB, and math tools to assist.

As stated previously, I would make an 8-frame, 10-frame (the one from APH) and a 20-frame when doing fraction concepts in math class using a PIAF.

For pre-teaching we will put quarters into the 8-frame and discuss how much money that equals and how much would be left given a certain total. We would use dimes for the tens frame and nickels for the 20-frame. For each tactile frame, I would make them the size of the coin to reinforce the different characteristics of the coins and how much each is worth.

I would make sure that he has met his goals regarding counting coins and making change. If he has not grasped that concept, I would review those concepts first.

Before the lesson with the O&M, I would make sure he has a firm grasp of using the frames for fractions and the connection between 1/10th on the 10-frame is the same as 10 cents out of $1 or that 2/8ths on the 8-frame is the same as ¼ and 50 cents out of $2 and that these answers depend on what amount the total equals.

As a follow-up I would wait until I knew what he bought and create questions that would pertain to his purchase.

For example: If he purchased 3 candies from the 25 cent bin and 2 candies from the 50 cent bin and he had $2 total.
   1. How much money did you spend? Answer: $1.75
   2. (Given a blank tactile 8-frame) How many squares represent one 25 cent candy if the total is $2 on this 8-frame? Answer: 1
   3. What fraction of the whole ($2) is this? Answer: ⅛
   4. (Given a blank tactile 8-frame) How many squares represent one 50 cent candy if the total is $2 on this 8-frame? Answer: 2
   5. What fraction of the whole ($2) is this? 2/8 or ¼
   6. (Given a blank tactile 8-frame) How many squares would be filled in to represent what you spent? Answer: 7
   7. What fraction of the whole ($2) is this? Answer: ⅞
   8. How much money did you have left? Answer: 25 cents
   9. What fraction of the whole ($2) is this? Answer: ¼
Candy is not taxed in AZ but if he bought something besides food or candy, I would add the following questions:

10. Was that enough to cover tax? Answer: yes
11. How much was the tax? Answer: 14 cents (given a sample of 8% sales tax)
12. How much money did you get for change? Answer: 11 cents
13. Did you have enough change to buy anything else? Answer: No