

First Grade Nemeth Braille Code Curriculum
Module 1: Addition and Subtraction to 10, the English Letter Indicator for
Multiple Choice, and the Long Dash
Teacher Reference Materials

Prerequisite skills:

- Ability to tactually identify the numbers 1-35
- Ability to tactually identify the general omission symbol, equals sign, plus sign, and minus sign
- Ability to write the numbers 1-35
- Ability to write the general omission symbol, equals sign, plus sign, and minus sign
- Ability to read and write the numbering of math problems from 1-35, including the punctuation indicator and period
- Ability to represent addition within 5 and 10
- Ability to decompose numbers less than or equal to 5 and 10
- Ability to represent subtraction within 5 and 10

Math symbols and concepts, including braille knowledge, addressed:

- Long dash
- Nemeth Braille Code equations in a horizontal format
- Fluently add and subtract within 10
- Relationship of three numbers in equations involving addition and subtraction within 10
- English letter indicator used with answer choices
- Punctuation indicator used with lettered answer choices followed by a period

Objectives:

The student will be able to:

- 1) Using a Five Frame, for any number from 0 to 5, find the number that makes 5 when added to the given number
- 2) Using a Ten Frame, for any number from 0 to 10, find the number that makes 10 when added to the given number
- 3) Read a long dash in a Nemeth Code equation within a horizontal format
- 4) Read Nemeth Code equations involving addition within a horizontal format that include numbers 0-10, plus sign, equals sign, and long dash

- 5) Read Nemeth Code equations involving subtraction within a horizontal format that include numbers 0-10, minus sign, equals sign, and long dash
- 6) Fluently add within 10, including with Nemeth Braille Code equations within a horizontal format
- 7) Determine the unknown whole number in an addition equation in a horizontal format within 10 that relates three whole numbers
- 8) Fluently subtract within 10, including with Nemeth Braille Code equations within a horizontal format
- 9) Determine the unknown whole number in a subtraction equation in a horizontal format within 10 that relates three whole numbers
- 10) Read a numbered math problem and associated answer choices that include an English letter indicator and letter, not followed by punctuation
- 11) Read a numbered math problem and associated answer choices that include an English letter indicator and letter, followed by a punctuation indicator and period
- 12) Use the Accessible Equation Editor and/or braillewriter to write the Nemeth long dash
- 13) Use the Accessible Equation Editor and/or braillewriter to write Nemeth Braille Code equations involving addition in a horizontal format
- 14) Use the Accessible Equation Editor and/or braillewriter to write Nemeth Braille Code equations involving subtraction in a horizontal format
- 15) Use the Accessible Equation Editor and/or braillewriter to write the English letter indicator
- 16) Appropriately use the English letter indicator when answering multiple choice questions

Other ECC skills addressed:

Listening skills; concept development; following directions; organization; tactual discrimination; left-to-right tracking; scan and interpret tactile graphics used in math; hand positioning; light touch (as opposed to scrubbing); recreation and leisure

Teaching tips:

- Before opening any BRF files in Duxbury, go into the Global menu. Select "Formatted Braille Importer" and then check the box for "Read formatted braille without interpretation" at the top of the window. This will ensure that nothing is changed when opening the BRF files.
- This module should be completed across multiple sessions.

- If the child is using a refreshable braille display, ensure that the child knows how to move to the next line of braille. Offer assistance as needed.
- If a student reads the Nemeth symbols or equation incorrectly, tell the student the correct way to read the symbol or equation.
- Sorting trays often define the work space. If you do not have sorting trays, you can use cafeteria type trays, cookie sheets, small cake pans, and/or small storage boxes.
- Using small storage boxes with labels can make it easier for a child to independently locate stored items such as number cards, etc.
- It may also help to place the number cards and hard copy braille on a nonslip surface such as rubber shelf liner so they will not move as the student is reading.
- If you are using hard copy braille, the student may also underline or circle the answer with a grease marker or crayon. Placing a small sticker on top of the answer is another option.
- Using the braillewriter for some of the writing activities is encouraged as it facilitates the development of motor memory.
- If needed, remind the student to move his/her fingers across the braille and check his/her work during writing activities.
- It is very important to use the correct finger on each key when learning new Nemeth symbols. This will help the student become accurate in their writing!

Materials/technology needed:

- Accessible Equation Editor and/or braillewriter
- Braille paper
- Index cards
- Work and/or sorting trays
- Pennies or counters
- Small stickers
- Small storage boxes
- Five Frame and Ten Frame (available in contracted and uncontracted braille within the curriculum)
- Braille game card and problem set for Connect Four (available in uncontracted and contracted braille within the curriculum)
- Flash cards (available in the curriculum)

Optional materials for follow-up activities or adaptation of activities:

- Assorted objects, Unifix blocks, Digi-Blocks, or base ten unit blocks
- Magnetic counters on a cookie sheet or magnetic board

- Rubber shelf liner
- Timer

Explanation of activities embedded into module:

- 1) One of the activities is a game called "Race to 5" with a Five Frame and pennies! The student will need a sorting tray and 3 flash cards for each number from 0-5. Similar to the other activities in the module, you may also place the Five Frame on a cookie sheet or magnetic board and use magnetic counters instead of pennies.

Shuffle the flash cards and then have the student draw a flash card. He/she will read the number on the flashcard and then use the Five Frame and pennies to tell you how many more are needed to make 5. As the child reads each number card, have him/her use a sorting tray to separate which cards he/she has read and which cards he/she has not read.

If needed, remind the student that no additional pennies would be needed to make 5 when he/she selects a flash card with the number 5 on it.

The student wins the game if he/she can tell you how many more are needed to make 5 for all of the numbers before the timer goes off. The length of time for the game should be based on the individual needs of the student. If desired, this game can be played more than once. The length of time can be decreased each time in order to promote fluency.

Later in the module, the student will play the game again, but with a Ten Frame and 2 flash cards for each number from 0-10. It is called "Zoom to Ten" since the numbers range from 0-10.

- 2) In some of the activities, students will use flash cards to practice reading addition problems and determining missing numbers.
- 3) For the activity on page 4 located in the module, you can either create flash cards with the equations below using index cards or emboss the flash cards on pages 1-2 of the braille document entitled "Flash Cards for Module 1_1". Answers are provided for you in parentheses to assist you in placing the answers on the back of the flash cards. If you are using a screen reader, you will want to select voicing of "all punctuation" in your settings.

$1+1 = ?$ (2)	$2+0 = ?$ (2)
$0+5 = ?$ (5)	$4+1 = ?$ (5)
$1+0 = ?$ (1)	$1+3 = ?$ (4)
$5+0 = ?$ (5)	$0+0 = ?$ (0)
$2+1 = ?$ (3)	$1+4 = ?$ (5)
$1+2 = ?$ (3)	$2+3 = ?$ (5)
$4+0 = ?$ (4)	$3+2 = ?$ (5)
$0+1 = ?$ (1)	$0+3 = ?$ (3)

Cut out the upper right corner of each flash card for easy identification of orientation. If you would like for the student to be able to use the flash cards independently, place only the answers on the back of each flash card using the Feel 'n Peel Stickers: Nemeth Braille-Print Numbers from American Printing House for the Blind.

Begin by shuffling the flash cards, and then have the student select a card. As the child reads each equation, have him/her use a sorting tray to separate which cards he/she has read and which cards he/she has not read.

Afterwards, have him/her tell you what number the general omission symbol stands for. If needed, the student can use manipulatives in order to determine what number the general omission symbol stands for. Once he/she can read all of the equations correctly, have him/her go back and time how quickly he/she can read the equations!

- 4) In some of the activities, the student will listen carefully and then write the numbers, braille symbols, or equations that he/she hears. These activities can be completed using the Accessible Equation Editor and/or a braillewriter and braille paper.

Begin each time by asking the student to listen carefully as you read numbers, braille symbols, or equations. Afterwards he/she will write the numbers, symbols, or equations in braille. Remind the student to check his/her work. An answer key has been provided for these activities in the document entitled "B3 Module 1_Answer Key for Writing Activities_1".

If your student is using a refreshable braille display for this activity, explain about the additional keys on the far right and far left. If your student is using a QWERTY keyboard with the Accessible Equation

Editor, it may be helpful to use tactile dots on the keys used for dot 1 and dot 4.

- 5) For the activity on page 15 in the module, create flash cards with the equations below using index cards or emboss the flash cards on pages 3-5 of the braille document entitled "Flash Cards for Module 1_1". Answers are provided for you in parentheses to assist you in placing the answers on the back of the flash cards. If you are using a screen reader, you will want to select voicing of "all punctuation" in your settings.

$1+2 = \underline{\quad}$	(3)	$3+ \underline{\quad} = 7$	(4)
$3+5 = \underline{\quad}$	(8)	$\underline{\quad} +5 = 6$	(1)
$\underline{\quad} +2 = 9$	(7)	$6+ \underline{\quad} = 10$	(4)
$8+0 = \underline{\quad}$	(8)	$7+ \underline{\quad} = 10$	(3)
$8+ \underline{\quad} = 9$	(1)	$9+ \underline{\quad} = 9$	(0)
$3+ \underline{\quad} = 4$	(1)	$4+5 = \underline{\quad}$	(9)
$2+8 = \underline{\quad}$	(10)	$2+6 = \underline{\quad}$	(8)
$\underline{\quad} +0 = 3$	(3)	$\underline{\quad} +1 = 6$	(5)
$4+ \underline{\quad} = 8$	(4)	$0+ \underline{\quad} = 0$	(0)
$5+2 = \underline{\quad}$	(7)	$\underline{\quad} +4 = 10$	(6)
$6+ \underline{\quad} = 8$	(2)	$5+ \underline{\quad} = 10$	(5)
$\underline{\quad} = 3+2$	(5)	$\underline{\quad} +3 = 6$	(3)
$1+1 = \underline{\quad}$	(2)	$\underline{\quad} = 4+2$	(6)
$5+ \underline{\quad} = 9$	(4)	$\underline{\quad} +1 = 10$	(9)

Similar to the other flash card activities, cut out the upper right corner of each flash card for easy identification of orientation. If you would like for the student to be able to use the flash cards independently, place only the answers on the back of each flash card using the Feel 'n Peel Stickers: Nemeth Braille-Print Numbers from American Printing House for the Blind.

Begin by shuffling the flash cards, and then have the student select a card. As the child reads each equation, have him/her use a sorting tray to separate which cards he/she has read and which cards he/she has not read.

Afterwards, have him/her tell you what number is missing. If needed, the student can use manipulatives in order to determine what number is missing. Once he/she can read all of the equations correctly, have

him/her go back and time how quickly he/she can read the equations containing the Nemeth long dash!

- 6) In one of the activities, students will find the long dash, determine the missing information in each equation, and then record their answer in braille. These activities can be completed using the Accessible Equation Editor and/or a braillewriter and braille paper.

Encourage the student to verbalize the process they use to determine the missing number. Provide assistance as needed. An answer key in braille is provided in "B3 Module 1_Answer Key for Writing Activities_1".

- 7) For the activity on page 21 in the module, create flash cards with the equations below using index cards or emboss the flash cards on pages 6-8 of the braille document entitled "Flash Cards for Module 1". Answers are provided for you in parentheses to assist you in placing the answers on the back of the flash cards. If you are using a screen reader, you will want to select voicing of "all punctuation" in your settings.

$6-2 = \underline{\quad}$	(4)	$8-0 = \underline{\quad}$	(8)
$8-4 = \underline{\quad}$	(4)	$5-1 = \underline{\quad}$	(4)
$7-2 = \underline{\quad}$	(5)	$9-8 = \underline{\quad}$	(1)
$10-5 = \underline{\quad}$	(5)	$8-8 = \underline{\quad}$	(0)
$8-5 = \underline{\quad}$	(3)	$9-3 = \underline{\quad}$	(6)
$10-2 = \underline{\quad}$	(8)	$3-1 = \underline{\quad}$	(2)
$7-5 = \underline{\quad}$	(2)	$8-2 = \underline{\quad}$	(6)
$9-0 = \underline{\quad}$	(9)	$6-5 = \underline{\quad}$	(1)
$1-1 = \underline{\quad}$	(0)	$4-3 = \underline{\quad}$	(1)
$10-7 = \underline{\quad}$	(3)	$6-3 = \underline{\quad}$	(3)
$4-1 = \underline{\quad}$	(3)	$10-3 = \underline{\quad}$	(7)
$6-0 = \underline{\quad}$	(6)	$4-2 = \underline{\quad}$	(2)
$2-1 = \underline{\quad}$	(1)	$5-2 = \underline{\quad}$	(3)
$10-1 = \underline{\quad}$	(9)	$7-6 = \underline{\quad}$	(1)

Similar to the other flash card activities, cut out the upper right corner of each flash card for easy identification of orientation. If you would like for the student to be able to use the flash cards independently, place the answers on the back of each flash card using the Feel 'n Peel

Stickers: Nemeth Braille-Print Numbers from American Printing House for the Blind.

Begin by shuffling the flash cards, and then have the student select a card. As the child reads each equation, have him/her use a sorting tray to separate which cards he/she has read and which cards he/she has not read.

Afterwards, have the child tell you the answer to the problem. If needed, the student can use manipulatives in order to determine the difference. Once he/she can read all of the equations correctly, have him/her go back and time how quickly he/she can read the subtraction equations containing the Nemeth long dash!

- 8) For one of the activities toward the end of the module, students will use the Accessible Equation Editor and/or their braillewriter and braille paper to record their answer. The students will begin by reading each problem and answer choices. Afterwards, they will write the problem number and letter of the correct answer choice. Then they will press their line spacing key twice to move to the next line of braille before beginning the next problem.

Encourage the student to pay close attention to the sign of operation and verbalize the process they use to determine the missing number. If needed, a Five/Ten Frame and pennies may be used. Also remind the student to move his/her fingers across the braille and check his/her work if needed. An answer key in braille is provided on page 8 of the document entitled "B3 Module 1_Answer Key for Writing Activities_1".

- 9) The follow-up activity is a new game for 2 or more players called Connect Four. Each player will need a Connect Four game card, the problem set, and markers. The problem set and game cards are included in a separate document; they are ready to be embossed. Answers are provided for you in parentheses to assist you in placing the answers on the back of the flash cards. If you are using a screen reader, you will want to select voicing of "all punctuation" in your settings.

Connect Four Problem Set

1. $3+7 = \underline{\quad}$ (10)
2. $4+4 = \underline{\quad}$ (8)
3. $\underline{\quad} +2 = 5$ (3)
4. $7-5 = \underline{\quad}$ (2)
5. $10-6 = \underline{\quad}$ (4)
6. $1+ \underline{\quad} = 9$ (8)
7. $6- \underline{\quad} = 3$ (3)
8. $2+3 = \underline{\quad}$ (5)
9. $5+ \underline{\quad} = 8$ (3)
10. $8-4 = \underline{\quad}$ (4)
11. $0+0 = \underline{\quad}$ (0)
12. $3+1 = \underline{\quad}$ (4)
13. $2+ \underline{\quad} = 3$ (1)
14. $7-7 = \underline{\quad}$ (0)
15. $8-2 = \underline{\quad}$ (6)
16. $\underline{\quad} +4 = 6$ (2)
17. $3- \underline{\quad} = 1$ (2)
18. $4+1 = \underline{\quad}$ (5)
19. $6- \underline{\quad} = 5$ (1)
20. $10-5 = \underline{\quad}$ (5)
21. $\underline{\quad} -3 = 4$ (7)
22. $9- \underline{\quad} = 7$ (2)
23. $0+1 = \underline{\quad}$ (1)
24. $2+ \underline{\quad} = 4$ (2)
25. $8-5 = \underline{\quad}$ (3)
26. $4- \underline{\quad} = 3$ (1)
27. $\underline{\quad} +3 = 10$ (7)
28. $1+1 = \underline{\quad}$ (2)
29. $7-6 = \underline{\quad}$ (1)
30. $3+ \underline{\quad} = 9$ (6)
31. $9- \underline{\quad} = 4$ (5)
32. $2+1 = \underline{\quad}$ (3)
33. $\underline{\quad} -7 = 1$ (8)
34. $\underline{\quad} +5 = 10$ (5)
35. $6- \underline{\quad} = 6$ (0)

Small stickers or pieces of Wikki Stix[®] can be used for markers. If you use Wikki Stix[®] pieces, roll them into a ball with your hand so that they will stick to the paper more easily. Another option is using pushpins on a cork board or magnets on a cookie sheet.

The first player to get 4 markers in a row wins the game! Each time a player finds a missing number in an equation, he/she will earn the right to place a marker on the number somewhere on his/her Connect Four game board. Once a player has 4 markers horizontally in a row, vertically in a column, or going diagonally, he/she will win by calling out "Connect Four".

Instructions for playing Connect Four:

Begin by telling the students that they will play until a winner calls out "Connect Four". Then have the players use their hands to explore their Connect Four game card. Let them know that the title is centered on the first line. Below the title the players will find 6 rows with six numbers on each row.

Next, let the students know that they will take turns reading equations on the Problem Set and then determine the missing information. If they correctly identify the missing number, they earn the right to find the missing number on the Connect Four game board and place a marker on top of it. There will be more than 1 of each number on the game board, so they will get to decide where to place their sticker or Wikki Stix® each time. Tell them to think about which one will help them get 4 markers in a row horizontally, vertically, or diagonally.

Continue playing until one of the students has 4 markers in a row and calls out "Connect Four". This activity can easily be completed with several students who read print or braille. You are welcome to play if no other students are available. If some of the players read print, add print to each of the game cards and problem set.

Materials Commercially Available:

Materials that could be used from the American Printing House for the Blind (www.aph.org) include

- FOCUS in Mathematics Kit, Second Edition that includes base ten blocks (with print Teacher's Guide 1-08280-01, with braille Teacher's Guide 1-08281-01)
- Small Work-Play Tray with Dividers (1-03751-00, 1-03770-00) *also available within the FOCUS in Mathematics Kit*
- *Feel 'n Peel Stickers: Nemeth Braille-Print Numbers 0-100 (1-08876-00)
- *Feel 'n Peel Point Symbols or Stars (1-08846-00; 1-08868-00; 1-08867-00)
- Math Drill Cards in Braille and Large Print: Addition Cards (1-03552-00)
- Math Drill Cards in Braille and Large Print: Subtraction Cards (1-03553-00)
- Quick Pick Math: Addition (1-03570-00)
- Quick Pick Math: Subtraction (1-03571-00)
* *WARNING: CHOKING HAZARD -- Small Parts. Not intended for children ages 5 and under without adult supervision.*

Materials that could be used from Wikki Stix® (<https://www.wikkistix.com/>) include

- Wikki Stix

Materials that could be used from the Digi-Block Store (<https://www.digiblock.com>) include

- Classic Block-of-100
- Power Block-of-100

Fun Facts from:

2011 DK Eyewitness Book: Flight

Backpacker Travel www.backpackertravel.org

National Park Service: The Road to the First Flight

<https://www.nps.gov/wrbr/learn/historyculture/theroadtothefirstflight.htm>

National Park Service: The Wright Brothers

<https://www.nps.gov/articles/wright-brothers.htm>

The History of Flight from Around the World – 1800s

<http://www.aiaa.org/SecondaryTwoColumn.aspx?id=3015>