

First Grade Nemeth Braille Code Curriculum
Module 3: Addition to 20 and Drawing and Building Shapes
Teacher Reference Materials

Prerequisite skills:

- Ability to tactually identify the numbers 1-20
- Ability to tactually identify the plus sign and separation line
- Ability to write the numbers 1-20
- Ability to write the plus sign and separation line
- Ability to read and write the numbering of math problems from 1-10, including the punctuation indicator and period
- Ability to represent addition within 10
- Tactually identify a circle, rectangle, square, and triangle

Math symbols and concepts, including braille knowledge, addressed:

- Nemeth Braille Code problems and equations in a vertical format
- Fluently add and subtract within 10
- Use multiple strategies to add within 20
- Relate counting to addition
- Add within 20 with Nemeth Code problems in a vertical format
- Tactually identify shapes, including a half-circle and trapezoid
- Verbally describe attributes of shapes, including a half-circle and trapezoid
- Use tactile drawing tools to create shapes

Objectives:

The student will be able to:

- 1) Read unnumbered and numbered Nemeth Code problems involving addition in a vertical format that include numbers 0-20, plus sign, and a separation line
- 2) Fluently add within 10, including with Nemeth Braille Code equations in a vertical format
- 3) Add within 20, including with Nemeth Braille Code equations in a vertical format
- 4) Write the answer to an addition problem using correct Nemeth Code in a vertical format
- 5) Use the braillewriter to write Nemeth Braille Code problems and equations involving addition within 20 in a vertical format
- 6) Tactually identify circle, triangle, rectangle, square, half-circle, and trapezoid regardless of size and orientation

- 7) Verbally describe attributes of shapes, including a half-circle and trapezoid
- 8) Use tactile drawing tools to create the following shapes: square, rectangle, circle, triangle, half-circle, and trapezoid

Other ECC skills addressed:

Listening skills; concept development; following directions; organization; tactual discrimination; left-to-right tracking; top-to-bottom tracking; spatial alignment; hand positioning; light touch (as opposed to scrubbing); scan and interpret tactile graphics used in math; 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.
- It is highly recommended that this module be completed with hard copy braille and a braillewriter instead of a refreshable braille display.
- 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.
- 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 needed, remind the student to move his/her fingers across the braille and check his/her work during writing activities.
- It may be helpful to point out that braille page numbers are placed at the right margin on the last line.
- It is very important to use the correct finger on each key when learning new Nemeth symbols. This will help the student continue to be accurate in their writing!
- General education classroom manipulative kits for 1st grade often include two-dimensional shapes in different sizes.
- Encourage the student to verbalize the process they use when solving problems and identifying shapes tactually.

- When teaching the child how to tactually discriminate 2-dimensional shapes, use a variety of sizes for the shapes. The child will also need to explore shapes in different orientations.
- It is recommended that shapes be drawn by using a continuous, clockwise motion.
- The student may draw the shapes free-hand or by using stencils.
- Shapes can be created in a variety of ways, including with Wikki Stix® or textured paper.
- Shapes can also be made with toothpicks and marshmallows if desired.

Materials/technology needed:

- Braillewriter
- Braille paper
- Index cards
- Flash cards (available in braille within the curriculum)
- Work and/or sorting trays
- Cookie sheet and magnets
- Supplies such as textured paper, cardboard, and/or foam board to make the 2-dimensional shapes
- inTACT Sketchpad or the DRAFTSMAN: Tactile Drawing Board
- Sketchpad stylus
- Stencils
- Flash cards (available in the curriculum)

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

- Unifix blocks, Digi-Blocks, or base ten unit blocks
- Magnetic counters
- Teddy Bear Counters
- Wikki Stix®
- Small storage boxes
- Math Window Braille Basic Math Kit in Nemeth
- Velcro dots and 1-inch embossed graph paper (from American Printing House for the Blind)
- Five Frame and Ten Frame (available in contracted and uncontracted braille within the curriculum)
- Rubber shelf liner
- Timer

Explanation of activities embedded into module:

- 1) In some of the activities, students will use flash cards to practice reading addition problems in vertical alignment and determining the sum.

For the activity on page 3 located in the module, you can either create flash cards with the problems below using index cards or emboss the flash cards on pages 1-2 of the braille document entitled "Flash Cards for Module 3_1". Answers are provided for you in parentheses to assist you in placing the answers on the back of the flash cards.

$$\begin{array}{r} 16 \\ + 3 \\ \hline (19) \end{array}$$

$$\begin{array}{r} 6 \\ + 2 \\ \hline (8) \end{array}$$

$$\begin{array}{r} 10 \\ + 1 \\ \hline (11) \end{array}$$

$$\begin{array}{r} 11 \\ + 0 \\ \hline (11) \end{array}$$

$$\begin{array}{r} 18 \\ + 1 \\ \hline (19) \end{array}$$

$$\begin{array}{r} 7 \\ + 4 \\ \hline (11) \end{array}$$

$$\begin{array}{r} 14 \\ + 3 \\ \hline (17) \end{array}$$

$$\begin{array}{r} 15 \\ + 4 \\ \hline (19) \end{array}$$

$$\begin{array}{r} 8 \\ + 1 \\ \hline (9) \end{array}$$

$$\begin{array}{r} 9 \\ + 0 \\ \hline (9) \end{array}$$

$$\begin{array}{r} 12 \\ + 5 \\ \hline (17) \end{array}$$

$$\begin{array}{r} 2 \\ + 9 \\ \hline (11) \end{array}$$

$$\begin{array}{r} 13 \\ + 2 \\ \hline (15) \end{array}$$

$$\begin{array}{r} 6 \\ + 3 \\ \hline (9) \end{array}$$

$$\begin{array}{r} 18 \\ + 0 \\ \hline (18) \end{array}$$

$$\begin{array}{r} 10 \\ + 4 \\ \hline (14) \end{array}$$

$$\begin{array}{r} 7 \\ + 2 \\ \hline (9) \end{array}$$

$$\begin{array}{r} 19 \\ + 1 \\ \hline (20) \end{array}$$

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. After the child reads each problem in vertical alignment and tells you the answer, have him/her use a sorting tray to separate which cards he/she has read and which cards he/she has not read.

- 2) For the activity on page 5 in the module, create flash cards with the problems below using index cards or emboss the flash cards on pages 3-4 of the braille document entitled "Flash Cards for Module 3_1". Answers are provided for you in parentheses to assist you in placing the answers on the back of the flash cards.

$$\begin{array}{r} 3 \\ +3 \\ \hline (6) \end{array} \quad \begin{array}{r} 1 \\ +1 \\ \hline (2) \end{array} \quad \begin{array}{r} 6 \\ +6 \\ \hline (12) \end{array}$$

$$\begin{array}{r} 8 \\ +8 \\ \hline (16) \end{array} \quad \begin{array}{r} 10 \\ +10 \\ \hline (20) \end{array} \quad \begin{array}{r} 7 \\ +7 \\ \hline (14) \end{array}$$

$$\begin{array}{r} 2 \\ +2 \\ \hline (4) \end{array} \quad \begin{array}{r} 5 \\ +5 \\ \hline (10) \end{array} \quad \begin{array}{r} 9 \\ +9 \\ \hline (18) \end{array}$$

$$\begin{array}{r} 4 \\ +4 \\ \hline (8) \end{array} \quad \begin{array}{r} 2 \\ +2 \\ \hline (4) \end{array} \quad \begin{array}{r} 0 \\ +0 \\ \hline (0) \end{array}$$

$$\begin{array}{r} 10 \\ +10 \\ \hline (20) \end{array} \quad \begin{array}{r} 6 \\ +6 \\ \hline (12) \end{array} \quad \begin{array}{r} 7 \\ +7 \\ \hline (14) \end{array}$$

$$\begin{array}{r} 3 \\ +3 \\ \hline (6) \end{array} \quad \begin{array}{r} 5 \\ +5 \\ \hline (10) \end{array} \quad \begin{array}{r} 9 \\ +9 \\ \hline (18) \end{array}$$

$$\begin{array}{r} 1 \\ +1 \\ \hline (2) \end{array} \quad \begin{array}{r} 4 \\ +4 \\ \hline (8) \end{array} \quad \begin{array}{r} 3 \\ +3 \\ \hline (6) \end{array}$$

- 3) In some of the activities, the student will listen carefully and then write the braille symbols, problems or equations that he/she hears. It is highly recommended that these activities be completed using a braillewriter and braille paper since spatially aligned problems require more than one line in braille.

Begin each time by asking the student to listen carefully as you read the braille symbols, problems, or equations. Afterwards he/she will write what he/she hears 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 3_Answer Key for Writing Activities_1".

- 4) The student will learn how to build vertically aligned problems using a cookie sheet and magnets with Nemeth numbers and symbols. You can use a braillewriter and small pieces of index cards to create the number and symbol cards. You will need the numbers 0-10 without the numeric indicator as well as the plus sign and separation line. After you braille the numbers and symbols on individual pieces of index cards, cut out the right top corner on each card and attach it to a magnet.

If preferred, you can use a $\frac{1}{2}$ sheet of 1-inch graph paper from American Printing House for the Blind to create a board for the activity. Attach a Velcro dot in each square. Afterwards, braille the numbers 0-10 without the numeric indicator as well as the plus sign and separation line. Then cut the numbers apart, cut out the right top corner, and place a Velcro dot on the back of each card.

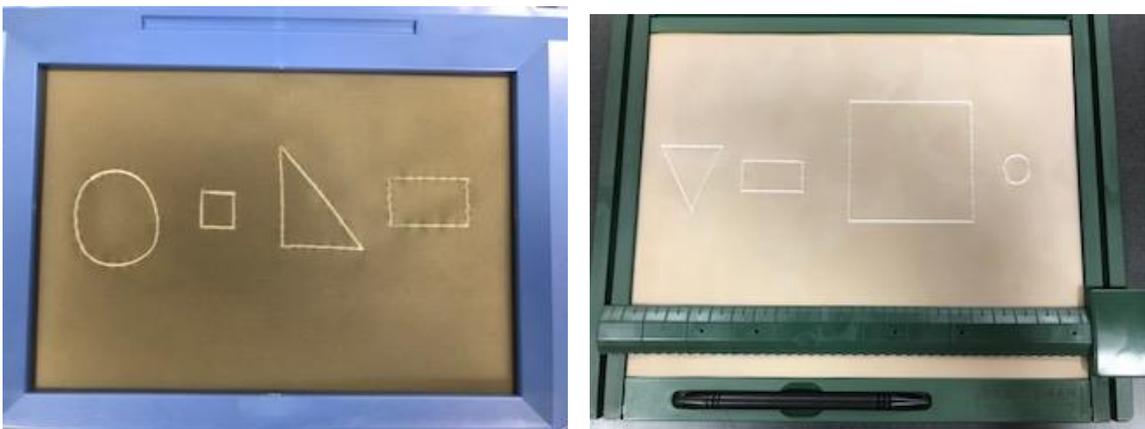
Before beginning the activities, have the student place the numbers and symbols in a work tray or on a piece of rubber shelf liner. This will help the cards to not move as much. It may also be helpful to remind the student that the numbers will not begin with a numeric indicator since they will be used in a spatially aligned addition problem.

Then follow the script in the B1 document to build the vertically aligned problems. It is important to invite the student to place his/her hands on top of your hands as you build the first problem so that he/she can see how you are building the problem.

If preferred, this activity may be completed with the Math Window Braille Basic Math Kit in Nemeth.

- 5) In an activity embedded in the module, students will scan tactile graphics of shapes that have been created with either the inTACT Sketchpad or DRAFTSMAN: Tactile Drawing Board.

Before beginning this activity, draw a triangle, square, circle, and a rectangle. You may use stencils or draw free-hand. It is recommended that shapes be drawn by using a continuous, clockwise motion. You will get more tactual feedback if you close your eyes when you draw the shapes using a stencil. In addition, the shapes should be of different sizes and orientations. You may also use a ball-point pen instead of a stylus.



If preferred, the shapes can be created with Wikki Stix[®], graphic art tape, or textured paper. Another option is to create the shapes with craft sticks and hot glue.

The activity will begin by telling the student to use both hands and scan the drawing film from left to right. Then ask the student to tell you about the shapes, moving from left to right. If needed, use hand-under-hand technique to model scanning the drawing film from left to right.

- 6) In another activity, students will learn to use tactile drawing tools, including the inTACT Sketchpad or the DRAFTSMAN, to create shapes. If students are not familiar with the tool, provide an opportunity for the student to explore the tool and learn how to place drawing film in and out of the tool before beginning the activity.

If there is a drawing film with tactile drawings already in the tool as you begin the activity, have the student remove the film from the

Sketchpad (or the DRAFTSMAN) and place a new sheet of tactile drawing film in the Sketchpad (or the DRAFTSMAN). Then tell the student that he/she will be using the stylus and a stencil to draw four shapes on the tactile drawing film. Also let the student know that the stylus is sometimes called a drawing tool.

If needed, provide information about how to hold the stylus and/or use hand-under-hand technique to draw the first shape together. It is recommended that shapes be drawn by using a continuous, clockwise motion. The student may also use a ball-point pen instead of a stylus. The student may even enjoy drawing the shapes free-hand. Once the student has finished drawing the shapes, encourage the student to check his/her work. End the activity by having the student tell you about his/her shapes.

- 7) In another activity embedded in the module, the student will use a shape chart to sort shapes into the following categories: half-circles, circles, rectangles, and triangles. In addition to the 2-dimensional shapes, the student will need a work tray and shape chart.

Begin by giving the student 5-7 half-circles, circles, rectangles, and triangles that are made of textured paper and adhesive backing. Another option is using shapes made of textured paper and double-sided tape. The shapes should be of various sizes and orientations.

Once the new shapes have been placed in the work tray, give the two-page shape chart (available in contracted and uncontracted braille within the curriculum) to the student.

Introduce the student to the shape chart and explain that the chart will provide a means for the student to organize his/her work as he/she explores the relationships among shapes.

Encourage your student to use his/her hands to explore the shape chart. Afterwards, ask the student to find the title and read it together. Then point out that there is a line going down the middle of the page. Have the student find the column headings at the top, and then help him/her read the headings. The column on the left is labeled circles, and the column on the right is labeled half-circles.

Now move to the second page. Let the student know that there is not a title at the top of the second page, but there is a line going down the middle of the page again. Have the student find the column headings toward the top of the page, and read them together. The column on the left is labeled triangles, and the column on the right is labeled rectangles.

A four-compartment sorting tray may be used instead of the shape chart. The compartments should be labeled circles, half-circles, triangles, and rectangles. The sorting tray may assist students in keeping their shapes in the correct columns.

Have the student select a shape from the work tray and ask "Is it a circle, half-circle, triangle, or rectangle and how do you know?" There are several possible correct responses to the question depending on the shape that is selected. If needed, assist the student in identifying and describing the shape.

Once the student has correctly shared how he/she identified the shape, have him/her remove the backing and place the shape in the correct column. For example, the student should put a circle in the column with a heading of circles. If needed, model placing the shape in the correct column using hand-under-hand technique.

Then have the student select another shape and repeat the process until all of the shapes are placed in the correct column on the shape chart.

- 8) The child will go on a shape hunt in one of the activities. Ensure that there are objects in the shapes of a half-circle, rectangle, trapezoid, and square in the room where you will be completing the shape hunt. Then give the student the following directions:

First, find 3 objects that are in the shape of a half-circle. Second, find 3 objects that are in the shape of a rectangle. Third, find 3 objects that are in the shape of a trapezoid. Fourth, find 3 objects that are in the shape of a square.

- 9) The student will create a picture or a shape by using shapes in the follow-up activity. You will need an assortment of same-sized squares, circles, rectangles, half-circles, triangles, and trapezoids that are made of craft foam or textured paper. Use the shapes to create a picture

and/or different shapes. For example, two half-circles can be used to create a circle or two triangles can be used to create a diamond. Then count and braille how many of each shape that you used to create the picture and/or different shape.

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)
- DRAFTSMAN: Tactile Drawing Board (1-08857-00)
- DRAFTSMAN: Tactile Drawing Film (25 sheets; 1-08858-00)
- DRAFTSMAN: Tactile Drawing Tool (61-151-070)
- DRAFTSMAN: Tactile Ruler, English (61-154-061)
- Graphic Art Tape (1-08878-00)
- Tactile Tangrams Kit (1-08439-00)
- Puzzle Form Board Kit (1-03721-00)
- Fractional Parts of Wholes: Circles (61-213-008)
- Embossed Graph Sheets: 1 inch Squares, 10 x 10 Grid (1-04058-00)
- *Picture Maker: Wheatley Tactile Diagramming Kit (1-08838-00) Many of these objects and a blue felt board are also available in the MathBuilders Unit 1 and the FOCUS in Mathematics Kits mentioned above.
- *Feel 'n Peel Point Symbols or Stars (1-08846-00; 1-08868-00; 1-08867-00)
- *Feel 'n Peel Stickers: Basic Math Symbols (1-08892-00)
- *Feel 'n Peel Sheets: Carousel of Textures (1-08863-00)
- Addition and Subtraction Table (5-82699-00)
* *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 Didax (<http://www.didax.com/teddy-bear-counters-96.html>) include

- Teddy Bear Counters

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

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

Materials that could be used from Math Window (<https://mathwindow.com/>) include

- Math Window Braille Basic Math Kit in Nemeth

Materials that could be used from E.A.S.Y. LLC.

(<http://www.easytactilegraphics.com/intact-products/>) include

- inTACT Sketchpad

Fun Facts from:

Crew Training: A Guide to Working with Hot Air Balloons

<http://cazooee.com/crewing/faqs.html> and

<http://cazooee.com/crewing/landing.html>

Encyclopedia.com

<http://www.encyclopedia.com/science-and-technology/technology/aviation-general/airplanes>

Science Kids: Fun Science & Technology for Kids

<http://www.sciencekids.co.nz/sciencefacts/vehicles/hotairballoons.html>

CBC Kids

<https://www.cbc.ca/kidscbc2/the-feed/4-fun-facts-about-hot-air-balloons>

Soft Schools

<http://www.softschools.com/facts/transportation/hot-air-balloon-facts/1189/>

Explain That Stuff

<https://www.explainthatstuff.com/how-hot-air-balloons-work.html>