

First Grade Nemeth Braille Code Curriculum

Module 3: Addition to 20 and Drawing and Building Shapes

Note: *It is recommended that this module be completed with hard copy braille and a braillewriter instead of a refreshable braille display.*

It's time to prepare for a hot air balloon ride! Before we begin our journey, locate the first line of braille on the page. It is at the top of the page. Softly glide your fingers across the line. It says First Grade Nemeth. Now move your hands down to the second line of braille on the page. It says Curriculum Module 3. Now move your hands down to the third line of braille on the page.

There is just one symbol on the third line. It is on the left side of the page.

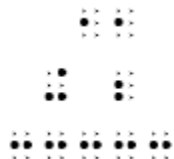


Do you remember what this symbol is called and its purpose? You got it! It is called an opening Nemeth Code indicator, and it tells us that we are going to read math or science.

Fun fact: Hot air balloons were the first aircraft to make use of the principle of buoyancy.

For the first part of our adventure, let's review how to read addition problems that are vertically aligned. As we discussed in the last module, this format is very helpful when we calculate or compute the answer!

Directly below the opening Nemeth Code indicator, there is a problem for you to explore with your hands.



The first addend is written directly above the second addend in the problem. Math problems are considered to be in spatial format when the numbers are vertically aligned. When we read and write addition problems and equations in vertical alignment, we do not use numeric indicators.

The problem begins with the number 11 in the first line. Now move your hands down to the next line. You will find a plus sign. Which dots make the

plus sign? You got it! Dots 3-4-6 make the plus sign. Notice that there is not a numeric indicator after the plus sign.

The plus sign is always spaced one cell to the left of the widest number in the spatially aligned addition problem. Since the addend on the first line contains two digits in this problem and the addend on the second line contains only one digit, there is a space between the plus sign and the second addend.

After the plus sign, there are the dots 2-3. What number is made with dots 2-3? Yes, the number 2 is made with dots 2-3.

So far our problem reads 11+2. On the third line, there is a line of dots 2-5. Do you remember what this is called in Nemeth? That is correct. In Nemeth we call this a separation line. It begins one cell to the left of the plus sign and continues to the right one cell beyond the numbers.

So our problem reads eleven plus two equals.

There are different strategies that we can use when adding if we do not know the answer immediately. One strategy is to count on. With this strategy, you begin with one of the addends and count on from that number. So this time let's begin with 11 and count on two more.

11, 12, 13

So what does $11+2$ equal? Yes, $11+2$ equals 13.

Note: If needed, Teddy Bear Counters, Unifix blocks, Digi-Blocks, or base ten unit blocks may also be used.

Try reading another problem. What does it begin with?

The figure shows a 3x3 grid of 2x2 sub-grids. Each sub-grid contains four dots in a 2x2 arrangement. The dots are either black (filled) or white (empty). The pattern of black dots varies across the sub-grids, representing different combinations of the four variables.

You got it, Nemeth superstar! The problem begins with the number 15. What follows the number 15 on the next line? Yes, there is a plus sign, followed by the number 3.

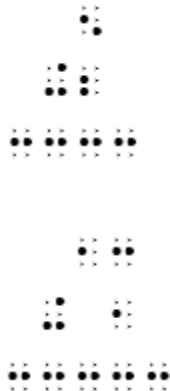
So our problem reads fifteen plus three equals. Let's use the count on strategy by beginning with 15 and count on 3 more.

15, 16, 17, 18

That's correct! Fifteen plus three equals 18!

Fun fact: The large, colorful balloon is called an envelope. The pilot and passengers usually stand in a wicker basket beneath the envelope.

Read the last two vertically aligned addition problems on the braille page and then use the count on strategy to determine the sum.



Yes, that's right. The first problem is 5+2. What is the line under the second addend called? Outstanding work! It is called a separation line.

Use the count on strategy and then tell me what 5+2 equals? Yes, five plus two equals seven!

Now it is time to read the second problem. Yes, the second problem is 13+1. Use the count on strategy to determine what 13+1 equals? You got it! Thirteen plus one equals fourteen.

Activity time: Let's use flash cards to practice reading problems in vertical alignment and using the count on method. Afterwards, tell me the answer before moving to the next flash card. Once you finish, go back and time how quickly you can read the problems! Do you think you can read the problems even quicker? If so, try one more time!

Note: *Flash cards are available in braille within the curriculum. It may be helpful to place the flash cards on a nonslip surface such as a rubber shelf liner for this activity.*

Good work, as always, Nemeth superstar! Now that the wicker basket has been unloaded from the trailer and the burner to heat the air has been started, it is time for us to practice our doubles facts. This is when a number is added to itself. For example, 3+3 is a doubles fact. Learning your doubles addition facts will help you quickly solve other addition facts in the future!

Now read the doubles addition problems on the top row of page 2 and then tell me the sum for each problem.

Note: *It may be helpful to point out that braille page numbers are placed at the right margin on the last line. Also point out that braille page numbers are transcribed in Unified English Braille, not the Nemeth braille code.*



Answer:

$$\begin{array}{r} 1 \\ +1 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 2 \\ +2 \\ \hline 4 \end{array}$$

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

$$\begin{array}{r} 4 \\ +4 \\ \hline 8 \end{array}$$

Yes, that's right. The first problem is 1+1. What does one plus one equal? You got it! One plus one equals two. Now move to the second addition problem and read it. Good job! The problem is 2+2. What does 2+2 equal? Yes, it equals 4.

Now find the next problem and read it. Yes, the problem is 3+3. What does 3+3 equal? Perfect! Three plus three equals six. Now find the last problem on this row and read it. Yes, it is 4+4. What does 4+4 equal? Yes, it equals 8.

Note: *If needed, Teddy Bear Counters, Unifix blocks, Digi-Blocks, or base ten unit blocks may be used. There are numerous songs about addition, including about doubles facts, available online if you would like to incorporate music. Please note that by the end of first grade, a student should be able to use multiple strategies to solve addition problems within 20.*

Let's move to the next row of problems. Read the problems, beginning with the one on the left. Then tell me the answer before moving to the next problem.



Answer:

$$\begin{array}{r} 5 \\ +5 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 6 \\ +6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 7 \\ +7 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 8 \\ +8 \\ \hline 16 \end{array}$$

Yes, the first problem is 5+5, and it equals ten. Now move to the second addition problem and read it. You got it! The problem is 6+6. What does 6+6 equal? Yes, it equals 12. Now find the next problem and read it. Yes, the problem is 7+7. What does 7+7 equal? Good job, Nemeth superstar! Seven plus seven equals fourteen. Now find the last problem on this row and read it. Yes, it is 8+8. What does 8+8 equal? Yes, it equals 16.

We are ready for the next row of problems. Just two more problems to go!



Answer:

$$\begin{array}{r} 9 \\ +9 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 10 \\ +10 \\ \hline 20 \end{array}$$

Way to go! The first problem is 9+9, and it equals 18. Now move to the second addition problem and read it. Yes, it is 10+10. What does 10+10 equal? That's correct. Ten plus ten equals twenty!

Fun fact: A sheep, a duck, and a rooster were the first passengers aboard a hot air balloon. The flight lasted about 8 minutes.

Activity time: Let's use flash cards to practice our doubles addition facts. Afterwards, tell me the answer before moving to the next flash card. Once you finish, go back and time how quickly you can read the problems! Do you think you can read the problems even quicker? If so, try one more time!

Note: Flash cards are available in braille within the curriculum. It may be helpful to place the flash cards on a nonslip surface such as a rubber shelf liner for this activity.

It is time for the basket to be attached to the colorful envelope! For the second part of the adventure, let's work together to review how to write spatially aligned addition problems.

Let's begin by writing

$$\begin{array}{r} 2 \\ +2 \\ \hline \end{array}$$

Note: Repeat saying each problem as many times as needed. 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 1 of the document entitled "B3 Module 3_Answer Key for Writing Activities_1".

In this problem, the addend in the first line will begin in cell 3 because the plus sign on the second line will begin in cell 2 and the separation line will begin in cell 1 on the third line. Place your fingers on the correct keys on your braillewriter, and let's get started. In order to braille the number 2 in cell 3, press the space bar twice.

How should we braille the number 2 in a vertically aligned problem? Yes, you should press dots 2-3. We will not need a numeric indicator since the problem is vertically aligned.

Press the line spacing key only once and move to the next line. The number 2 will be brailled directly below the addend in the first line. Since this is a vertically aligned problem, how do we write the number 2? Yes, you should press dots 2-3. We will not need a numeric indicator again since the problem is vertically aligned.

Where will we braille the plus sign? Yes, we will place the plus sign one cell to the left of the number 2 on the second line. Use the backspace key to line up the embossing head so that we can write the plus sign one cell to the left of the number 2. Then press the line spacing key only once and move to the next line.

Now you are ready to braille the separation line below the plus sign and number 2. How do you braille a separation line? Yes, we press the dots 2-5 four times to make the separation line. It will begin in cell 1 and continue one cell to the right of the numbers.

Way to go, co-pilot! Let's write another problem.

$$\begin{array}{r} 5 \\ +5 \\ \hline \end{array}$$

What should we braille first? Yes, begin by brailing the first addend on the first line. What cell will it begin? You got it! The number 3 will be in the third cell in this problem since the addends are one digit numbers again. Place your fingers on the correct keys on your braillewriter and press the space bar twice so that we can write the number 5 in the third cell.

How should we braille the number 5 in a vertically aligned problem? Yes, you should press dot 2-5. We will not need a numeric indicator again since the problem is vertically aligned.

What should we do next? That's correct. We need to press the line spacing key only once to go the next line and braille the plus sign and number 5. The number 5 will be brailled directly below the first addend. Use the backspace key to line up the embossing head and braille the plus sign and number 5. Remember that the plus sign should be one cell to the left of the numbers.

Once you are finished, press the line spacing key only once and move to the next line. Now you are ready to braille the separation line below the plus sign and numbers. How do you braille a separation line? Yes, press the dots 2-5 four times to make the separation line. It will begin in cell 1 and continue one cell to the right of the numbers.

Fun fact: Hot air balloons were invented in France in 1783 when it was discovered that a fabric bag filled with hot air would rise.

Now it is time for you to write more doubles addition problems! After you write each problem, press your line spacing key three times.

Note: Repeat saying each problem as many times as needed. 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 pages 2-3 of the document entitled "B3 Module 3_Answer Key for Writing Activities_1".

$$\begin{array}{r} 3 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ +0 \\ \hline \end{array}$$

Fun fact: Unlike other modes of transportation, you cannot steer a hot air balloon.

The colorful envelope has been laid on the ground. Now it is time to inflate the balloon with cold air! For the third part of the adventure, let's use our last set of doubles addition problems and review how to write answers for addition problems that are vertically aligned. Begin by placing your paper in the braillewriter, and then roll the paper into the braillewriter by using the knobs on either side of the braillewriter. The paper should stop automatically. Then push the line spacing key.

We will write the answer to each addition problem on the line that is below the separation line. So, let's work together to find the first problem and press the line spacing key until the embossing head is on the line below the separation line. Then we will use the space bar to line up the embossing head so that we can write the sum directly under the addends. You can see now how vertical aligned problems make it easier to calculate or compute the answer!

Note: *Provide assistance as needed. 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 pages 4-5 of the document entitled "B3 Module 3_Answer Key for Writing Activities_1".*

Read the first problem again. Yes, it is three plus three. What does three plus three equal? You got it! The sum is six. We will braille the answer below

the separation line so that it is vertically in line with the addends. Since the problem is vertically aligned, we will not use a numeric indicator.

Press your line spacing key so that you are below the separation line. Also make sure that your embossing head is vertically in line with the addends. You got it!

Note: *Provide assistance in lining up the embossing head with the addends as needed.*

What keys on the braillewriter should we press for 6? Yes, we would press dots 2-3-5. Confirm that your fingers are on the correct keys, and then you will be ready to braille the number 6!

Good job, Nemeth superstar! Let's try two more together. Use your hands and find the next problem. You found it! Now read the problem. Yes, it is nine plus nine. Show me where we will write the answer. Perfect! We will write the answer below the separation line and the embossing head will be vertically in line with the addends.

What does nine plus nine equal? Yes, nine plus nine equals eighteen.

Note: *If needed, Teddy Bear Counters, Unifix blocks, Digi-Blocks, or base ten unit blocks may be used.*

Where will we braille the answer? Yes, we will write the answer below the separation line. The digits in eighteen will be aligned by place value. The one will be in the tens column and the eight will be in the ones column. Let's line up our embossing head together. You are ready to write your answer! You got it! Congratulations!

Co-pilot, you are ready to write the answers for the rest of the problems. Afterwards, we will check your work together. Let me know if you need any help.

Fun fact: Hot air balloons have a ground crew that follows the balloon throughout the flight. They pick up the pilot, balloon, and passengers at the end of the flight.

The balloon is filled with cold air, and the pilot has activated the burner to heat the air in the balloon! Now the colorful balloon is slowly rising into the air! For the fourth part of our adventure, let's review how to write spatially aligned addition problems with one or more two-digit numbers. We will begin by using a cookie sheet and magnets with Nemeth numbers and symbols to build the addition problems.

Note: *If preferred, this activity may also be completed with the graph paper board that you created in the previous module. You will need to create number cards and a separation line that is 5 cells long. In addition, this activity may be completed with the Math Window Braille Basic Math Kit in Nemeth.*

Begin by helping me build

$$\begin{array}{r} 12 \\ +3 \\ \hline \end{array}$$

The first step is to locate the numbers and symbols needed to build the problem. Help me find the numbers 12 and 3 as well as the plus sign and the separation line. Remember that the numbers will not begin with a numeric indicator since they will be used in a spatially aligned addition problem.

You are welcome to place your hands on top of my hands so that you can see how I am building the problem. We are ready to place the first addend on the cookie sheet. I am placing the number 12 in the middle of the cookie sheet. The one is in the tens column and the two is in the ones column.

Let's move our hands directly below the number 12 and place the second addend 3 in the ones column. We will place the plus sign one cell to the left of the widest number above the separation line in the problem. That means that there will be a space between the plus sign and the three in this problem.

Now we are ready to build the separation line below the plus sign and number 3. We will place it slightly below and one cell to the left of the plus sign because the separation line should extend one cell to the left of the plus sign and one cell to the right of the numbers. You got it! Notice this time that the separation line is five cells long.

Good job, Nemeth superstar! The pilot is ready to welcome the passengers! The large wicker basket is large enough to hold 8 to 10 passengers. While we are waiting for your turn to board the hot air balloon, let's move to the braillewriter! Begin by inserting a piece of your paper in your braillewriter and then we will be ready to write the same addition problem.

$$\begin{array}{r} 12 \\ +3 \\ \hline \end{array}$$

Note: Repeat saying each problem as many times as needed. 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 6 of the document entitled "B3 Module 3_Answer Key for Writing Activities_1".

In this problem, the addend of 12 in the first line will begin in cell 3 because the plus sign on the second line will begin in cell 2 and the separation line will begin in cell 1 on the third line. Place your fingers on the correct keys on your braillewriter, and let's get started. In order to begin the number 12 in cell 3, press the space bar twice.

How should we braille the number 12 in a vertically aligned problem? Yes, you should press dot 2, followed by dots 2-3. We will not need a numeric indicator since the problem is vertically aligned. The one is in the tens column and the two is in the ones column.

Press the line spacing key only once and move to the next line. The number three will be brailled directly below the number 12. The number 3 in the second line will be in the ones column. This means that the number 3 will be placed directly below the two in twelve.

Where will we braille the plus sign? Yes, we will place the plus sign one cell to the left of the number 3. There will be a blank space between the plus sign and the number 3. Use the backspace key to line up the embossing head so that the plus sign will be one cell to the left of the widest number in the problem. Then press the line spacing key only once and move to the next line.

Now you are ready to braille the separation line below the plus sign and number 3. How do you braille a separation line? Yes, we press the dots 2-5 to make the separation line. It will begin in cell 1 and continue one cell to the right of the numbers. Way to go, co-pilot!

Fun fact: Hot air balloons were used in the American Civil War by both sides for reconnaissance missions.

Let's write another problem together.

$$\begin{array}{r} 14 \\ +2 \\ \hline \end{array}$$

Note: Repeat saying each problem as many times as needed. 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 6 of the document entitled "B3 Module 3_Answer Key for Writing Activities_1".

In this problem, the addend of 14 in the first line will begin in cell 3 because the plus sign on the second line will begin in cell 2 and the separation line will begin in cell 1 on the third line. Place your fingers on the correct keys on your braillewriter, and let's get started. In order to begin the number 14 in cell 3, press the space bar twice.

How should we braille the number 14 in a vertically aligned problem? Yes, you should press dot 2, followed by dots 2-5-6. We will not need a numeric indicator since the problem is vertically aligned. The one is in the tens column and the four is in the ones column.

Press the line spacing key only once and move to the next line. The number two will be brailled directly below the number 14. The number 2 in the second line will be in the ones column. This means that the number 2 will be placed directly below the four in fourteen.

Where will we braille the plus sign? Yes, we will place the plus sign one cell to the left of the number 2. There will be a blank space between the plus sign and the number 2. Use the backspace key to line up the embossing head so that the plus sign will be one cell to the left of the widest number in the problem. Then press the line spacing key only once and move to the next line.

Now you are ready to braille the separation line below the plus sign and number 2. How do you braille a separation line? Yes, we press the dots 2-5 to make the separation line. It will begin in cell 1 and continue one cell to the right of the numbers. Way to go, co-pilot!

Fun fact: The fathers of ballooning are sometimes said to be the Montgolfier brothers, Joseph and Jacques. In 1783, after a series of experiments, the brothers constructed a balloon large enough to carry two humans into the atmosphere, the first manned aircraft.

Activity time: You will need your braillewriter and braille paper for the next activity. Listen as I read the vertically aligned addition problems and then braille what you hear. Some of the problems will have a two-digit number and some will not have any two-digit numbers. After you write each problem, write the sum below the separation line and then press your line spacing key twice.

Note: Provide assistance as needed. An answer key in braille is provided on pages 7-8 of the document entitled "B3 Module 3_Answer Key for Writing Activities_1".

$$\begin{array}{r} 3 \\ +3 \\ \hline \end{array}$$

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

$$\begin{array}{r} 8 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 19 \\ +0 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +8 \\ \hline \end{array}$$

Fun fact: The record height for a hot air balloon flight is 68,986 feet. The pilots had to wear oxygen masks to stay alive.

Note: Before beginning the next section, you may want to listen to a song about shapes or read a book about shapes. The National Braille Press and Seedlings sell "DK Braille: Shapes" which includes tactile pictures of shapes.

In addition to a work tray, you will need several 2-dimensional circles, half-circles, triangles, rectangles, trapezoids, and squares. Many of these manipulatives are available in the MathBuilders, Unit 1: Matching, Sorting, and Patterning Kit; MathBuilders, Unit 6: Geometry Kit; and the Focus in Math Kit available from the American Printing House for the Blind. If

preferred, you can use textured paper to create the shapes. Feel 'n Peel Sheets: Carousel of Textures from American Printing House for the Blind has a variety of non-adhesive backed textured paper.

It is your turn to board the hot air balloon! There is a rail at the top of the basket for you to hold onto if you would like, especially since you will be standing during the hot air balloon ride! For the fourth part of our adventure, let's learn more about shapes. You learned about squares, rectangles, triangles, and circles in Kindergarten. What do you remember about these shapes?

Note: *There are several possible correct responses to the question. For example, a circle is a perfectly round shape; a triangle has 3 sides and 3 corners; and a rectangle has 4 sides and 4 corners. Other answers may include: the opposite sides of a rectangle are the same length; a square is a special kind of rectangle; and all 4 sides of a square are the same length.*

Depending on the child's familiarity with the basic shapes and response to the question about the shapes, it may be necessary to reintroduce the shapes before beginning the next activity. An introduction to these shapes and an activity is included in Kindergarten Module 6 on pages 11-13 of the B1 document.

Place three circles, triangles, squares, and rectangles in a work tray.

There is a variety of shapes in your work tray. Pick up one shape at a time and tell me if it is a square, rectangle, triangle, or circle.

Very nice! Now place the objects back in the work tray. I have used the inTACT Sketchpad (or the DRAFTSMAN: Tactile Drawing Board) to draw a triangle, square, circle, and a rectangle.

Note: *Additional information about drawing shapes is available in the Teacher Reference Materials. You may also use Wikki Stix® or textured paper to create the shapes.*

Use both hands and scan the drawing film from left to right. Then tell me about the shapes, moving from left to right!

Note: *If needed, use hand-under-hand technique to model scanning the drawing film from left to right.*

Now remove the film from the Sketchpad (or the DRAFTSMAN) and place a new sheet of tactile drawing film in the Sketchpad (or the DRAFTSMAN). Let's use the stylus and a stencil to draw the four shapes on the tactile

drawing film using the Sketchpad or the DRAFTSMAN. The stylus is sometimes called a drawing tool.

Note: *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. You may also use a ball-point pen instead of a stylus. The student may also enjoy drawing the shapes free-hand.*

Once the student has finished drawing the shapes, encourage them to check his/her work.

Excellent drawing, shape superstar! Tell me about your drawings.

Fun fact: Hot air balloons cannot fly in the rain.

Now, let's place the Sketchpad (or the DRAFTSMAN) to the side. Take a moment to explore this circle.

If I cut the circle into two equal parts, then I will have two half-circles.

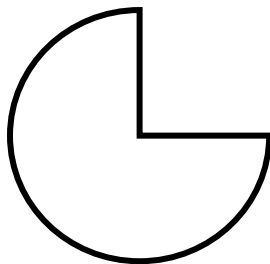
Note: *Give the student a circle made of paper or another material that can be easily cut. After the student explores the circle, use scissors to cut it into halves. If desired, the student can assist you. Then give the student the half-circles.*

Sometimes half-circles are called semi-circles. Take a minute and explore the half-circles with your hands.

The two half-circles are the same size because we cut the circle into two equal parts. What else did you notice about the half-circles?

Note: *There are several possible correct responses to the question. For example, each half-circle has a straight edge, and two half-circles can be put together to make a circle.*

Let's explore a shape that is not a half-circle. How is this shape different from a half circle?



Note: *The shape may be created using textured paper or foam board. The shape may also be created using the inTACT Sketchpad, the DRAFTSMAN: Tactile Drawing Board, or Wikki Stix®. In addition, there are several possible correct responses to the question. For example, there is more than one straight line in the shape.*

Very nice description of the shape! Let's go back to our work tray. Begin by removing all of the shapes from the work tray and placing them in a bag or small box.

Note: *Then give 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.*

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.

Use your hands to explore the first page of the shape chart. Now let's find the title and read it together. Where will we find the title?

That's right, pilot! The title will be at the top of the page. The title is Shape Chart.

Notice that there is a line going down the middle of the first page. Find the column headings toward the top of the page, and I will help you read them. The column on the left is labeled circles, and the column on the right is labeled half-circles.

Note: *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 easily keeping their shapes in the correct columns.*

Now move to the second page. Notice 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. Find the column headings toward the top of the page, and let's read them together. The column on the left is labeled triangles, and the column on the right is labeled rectangles.

Begin by selecting a shape from the work tray. Is it a circle, half-circle, triangle, or rectangle and how do you know?

Note: *There are several possible correct responses to the question depending on the shape that is selected. For example, the student may know that the shape is a circle since it is round.*

Now, remove the backing and place the shape in the correct column. For example, put a circle in the column with a heading of circles.

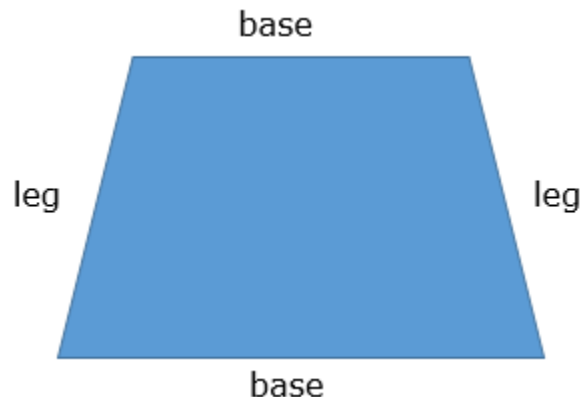
Note: *If needed, model placing the shape in the correct column using hand-under-hand technique.*

Good job, shape explorer! Now select another shape and repeat the process until all of the shapes are placed in the correct column on the shape chart.

Fun fact: The longest hot air balloon flight was recorded by pilot Richard Branson. The balloon flight originated in Japan and ended in northern Canada. The balloon flew at 245 miles per hour.

The pilot has activated the burner, and the air is getting hotter in the envelope! Let's learn about another shape called a trapezoid while we are rising into the air. Take a minute and explore the trapezoid with your hands.

Note: *A sample trapezoid is shown below. If desired, the sample can be used as a pattern to create a trapezoid out of foam board or textured paper.*



What did you notice about this trapezoid?

Note: *There are several possible correct responses to the question. For example, a trapezoid has 4 sides and 4 corners, but not all of the sides are equal in length.*

Let's count the number of sides together.

1 2 3 4

Yes, a trapezoid has 4 sides. In addition, exactly two of the sides of the trapezoid are parallel. The parallel sides are always the same distance from each other and will never touch.

Note: *If needed, use hand-under-hand technique to show the student what is meant by parallel sides.*

The parallel sides in a trapezoid are called bases, and nonparallel sides are called legs. Show me on the trapezoid which sides are a base and which sides are a leg. You got it!

The nonparallel sides are not always the same distance from each other. At the top of the shape, the legs are closer to each other than they are at the bottom of the shape.

Note: *Give the student a rectangle and/or a square to explore.*

So how is a trapezoid different from a rectangle or a square?

Note: *There are several possible correct responses to the question. For example, a rectangle has four right angles and a trapezoid does not. In addition, opposite sides of a rectangle are parallel and equal in length. In a trapezoid, one pair of the opposite sides are not parallel.*

Let's place a new sheet of tactile drawing film in the Sketchpad (or the DRAFTSMAN) and practice drawing a half-circle and a trapezoid.

Note: *If needed, remind the student 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. Using stencils may also be helpful. You may also use a ball-point pen instead of a stylus.*

Once the student has finished drawing the shapes, encourage them to check his/her work.

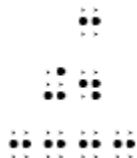
Fun fact: The first manned balloon flight travelled over Paris for 5.5 miles. It stayed airborne for 23 minutes.

Activity time: Let's go on a shape hunt around the room. 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.

The wind is guiding our journey! As we float high in the sky, let's learn about two addition strategies called "doubles plus one" and "doubles plus two". We

can use what we know about doubles facts to help us solve other addition problems. Let's talk through an example problem together.

Begin by reading the addition problem at the top of page 3.



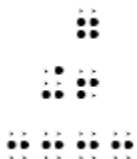
Yes, that's right. The problem is $3+4$. Using the doubles plus one strategy, we begin with a known double addition fact. So what does three plus three equal? You got it! Three plus three equals six. Now add one. Six plus one equals seven. Thus, three plus four equals seven. Now move to the second addition problem on the page and read it.



Good job! The problem is $5+6$. So what double addition fact would we begin with? Yes, five plus five. What does $5+5$ equal? Yes, it equals 10. Now add one. You got it! Ten plus one equals eleven.

So what does $5+6$ equal? Perfect! Five plus six equals eleven.

Now move to the third addition problem on the page and read it.

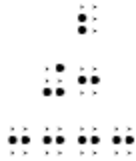


The problem is $7+6$. Sometimes the larger number comes first in the problem. So what double addition fact would we begin with? Yes, six plus six. What does $6+6$ equal? Yes, it equals 12. Now add one. That's correct! Twelve plus one equals thirteen.

So what does $7+6$ equal? Yes! Seven plus six equals thirteen.

Note: *There are multiple strategies that can be used when adding. For example, the student could also use the "doubles minus one" strategy to easily solve this problem.*

Now find the next problem and read it.



Yes, the problem is $2+3$. Talk through the doubles plus one strategy and then tell me what $2+3$ equals.

Answer: The problem is $2+3$. I would begin with the double addition fact, two plus two. It equals 4. Now I need to add one. 4 plus one equals five. So, two plus three equals five.

Perfect! Two plus three equals five. Now find the last problem on the page and read it.



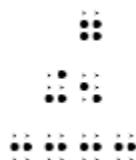
Yes, the problem is $9+8$. Once again, talk through the doubles plus one strategy and then tell me what $9+8$ equals.

Answer: The problem is $9+8$. Sometimes the larger number comes first in the problem. So I would begin with the double addition fact, eight plus eight. It equals 16. Now I need to add one. Sixteen plus one equals seventeen. So, nine plus eight equals seventeen.

You got it, math superstar! Yes, nine plus eight equals 17.

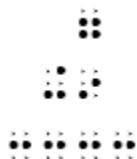
Fun fact: The Federal Aviation Administration governs hot air balloons using the same rules as airplanes. Individuals must be trained and tested before becoming certified as a pilot.

The doubles plus two strategy is very similar. We begin with a known double addition fact and then add two. For example, let's try the strategy with $7+5$. It is the first problem on page 4.



Once again the larger number comes first! The known double addition fact would be $5+5$. So what does five plus five equal? You got it! Five plus five

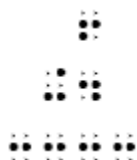
equals ten. This time we would add two. So ten plus two is twelve. Thus, seven plus five equals twelve. Now read the second addition problem.



Excellent! The problem is $7+9$. So what doubles addition fact would we begin with? Yes, seven plus seven. What does $7+7$ equal? Yes, it equals 14. Now add two. That is correct! Fourteen plus two equals sixteen.

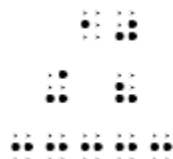
So what does $7+9$ equal? That is correct! Seven plus nine equals sixteen.

Now find the third problem and read it.



You got it! The problem is $6+4$. So what doubles addition fact would we begin with? Yes, four plus four. What does $4+4$ equal? Yes, it equals 8. Now add two. That is correct. Eight plus two equals ten. So, six plus four equals ten.

Let's try one more problem together. Begin by reading the last problem on the page.















Yes, the problem is $10+8$. Talk through the doubles plus two strategy and then tell me what $10+8$ equals.

Answer: The problem is $10+8$. I would begin with the double addition fact, eight plus eight. It equals 16. Now I need to add two. Sixteen plus two equals eighteen. So, ten plus eight equals eighteen.

Perfect! Ten plus eight equals eighteen.

Activity time: Read each of the numbered addition problems on page 5. Use the new addition strategies we have learned and tell me the answer before moving to the next problem.

Answer:

1.	$\begin{array}{r} 1 \\ +3 \\ \hline 4 \end{array}$	2.	$\begin{array}{r} 6 \\ +8 \\ \hline 14 \end{array}$	3.	$\begin{array}{r} 5 \\ +6 \\ \hline 11 \end{array}$
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Answer:

4.	$\begin{array}{r} 6 \\ +7 \\ \hline 13 \end{array}$	5.	$\begin{array}{r} 2 \\ +3 \\ \hline 5 \end{array}$	6.	$\begin{array}{r} 9 \\ +7 \\ \hline 16 \end{array}$
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Answer:

7.	$\begin{array}{r} 8 \\ +9 \\ \hline 17 \end{array}$	8.	$\begin{array}{r} 4 \\ +3 \\ \hline 7 \end{array}$	9.	$\begin{array}{r} 7 \\ +8 \\ \hline 15 \end{array}$
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Answer:

10.	$\begin{array}{r} 10 \\ +8 \\ \hline 18 \end{array}$
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Below the last problem, there is a Nemeth Code terminator.



This symbol tells us that we are almost finished with our math adventure. Sometimes this symbol comes at the end of a braille document, just like it is this time. This symbol can also be used in other places within a document to tell us that we are finishing a math section and are moving to literary material.

Fun fact: The world's largest balloon festival is hosted in Albuquerque, New Mexico each year. It features more than 750 hot air balloons.

Now that we are almost finished with our journey, the hot air balloon is getting closer to the ground! Before we land, let's practice writing addition problems on the braillewriter and using all of the mental math strategies we have learned for addition. We learned the count on strategy as well as the "doubles", "doubles plus one", and "doubles plus two" strategies.

Activity time: You will need your braillewriter and braille paper for this activity. Listen and then braille what you hear. Then use a mental math strategy and write the answer to the problem. You will need to press your line spacing key twice to move to the next line before brailleing a problem each time.

Note: Repeat saying each problem as many times as needed. 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 pages 9-10 of the document entitled "B3 Module 3_Answer Key for Writing Activities_1".

$$\begin{array}{r} 14 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ +3 \\ \hline \end{array}$$

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

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

$$\begin{array}{r} 9 \\ +9 \\ \hline \end{array}$$

Excellent work, Nemeth superstar! Let's try a few more. This time number the problems. We will talk through the first one together.

$$\begin{array}{r} 1. \quad 4 \\ \quad +4 \\ \hline \end{array}$$

What should we braille first? Yes, begin by braille the number 1 followed by a punctuation indicator and period on the first line. What cell will it begin? You got it! The numeric indicator will begin in cell 1.

Now that you are finished numbering the problem, let's talk through how many times we will need to press the space bar. First, we will need to press it once so that we will have a blank cell between the period and the beginning of the problem. Second, we will need to press it two more times. This will leave room for the beginning of the separation line and the plus sign.

How should we braille the number 4 in a vertically aligned problem? Yes, you should press dot 2-5-6. We will not need a numeric indicator again since the problem is vertically aligned.

What should we do next? That's correct. We need to press the line spacing key only once to go the next line and braille the plus sign and number 4. The number 4 will be brailled directly below the first number 4. Use the backspace key to line up the embossing head and braille the plus sign and number 4. Remember that the plus sign should be on the left side of the numbers.

Once you are finished, press the line spacing key only once and move to the next line. Now you are ready to braille the separation line. It will begin one cell before the plus sign and continue one cell beyond the numbers. How do you braille a separation line? Yes, press the dots 2-5 to make the separation line.

Way to go, pilot! Time now to braille the rest of the problems that I read to you.

Note: Continue to repeat saying each problem as many times as needed. An answer key in braille is provided on pages 11-12 of the document entitled "B3 Module 3_Answer Key for Writing Activities_1".

$$\begin{array}{r} 2. \quad 12 \\ \quad +1 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 7 \\ \quad +7 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 11 \\ \quad +3 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 4 \\ \quad +5 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 10 \\ \quad +10 \\ \hline \end{array}$$

Fun fact: The pilot turns the burner on and off to keep the balloon hovering at the right speed.

Now that the hot air balloon has safely returned to the ground, let's finish our adventure with a follow-up activity.

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.

Note: Commercially available pattern blocks or Tactile Tangrams blocks from American Printing House for the Blind may also be used. If preferred, the shapes can be made with textured paper and adhesive backing so that the new shape and/or picture can be attached to cardboard or construction paper and then displayed or taken home. Another option is using shapes made of textured paper and double-sided tape.