



Creating On-Demand Tactile Graphics Guidance

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Section 1: Overview

The user interface elements and item images used in some of our digital products have been enhanced with alternative text. Alternative text tells viewers who are blind or have low vision the nature or contents of an image. This text does not appear on screen visually. It is read using supported screen-reader software (e.g., JAWS®, NVDA, and VoiceOver).

There are some instances when a student may request or require a tactile graphic to access an item enhanced by alt text. We have implemented a notice when tactile materials are needed or may be helpful in some of our digital products, including *i-Ready Inform*™ (all subjects)*, Digital Practice**, and Live Class***. We plan to expand this approach to additional areas of our products on an ongoing basis.

This guidance brief provides educators with information about how to create tactile graphics on demand. The document includes information about:

- Types of alt text and tactile graphics students may encounter
- Preparing to create tactile graphics
- Common images by grade band and content area

The Curriculum Associates Commitment

At Curriculum Associates, we believe every student has the potential for educational excellence. That's why we're dedicated to creating accessible materials that maximize usability for people with disabilities. We strive to ensure that accessibility and accommodation support considerations are incorporated into our product development process from the very beginning, and we've developed a continual improvement approach to accessibility that ensures we're always improving and learning.

i-Ready Inform™ is the new name for the adaptive assessment previously named "*i-Ready Diagnostic*."

*For specific guidance around supports for students who are blind or have low vision using *i-Ready Inform*, please refer to Section 2 of the [i-Ready Inform Accessibility Guidance document](#).

**For specific guidance around supports for students who are blind or have low vision using Digital Practice, please refer to Section 2 of the [Digital Practice Accessibility Guidance document](#).

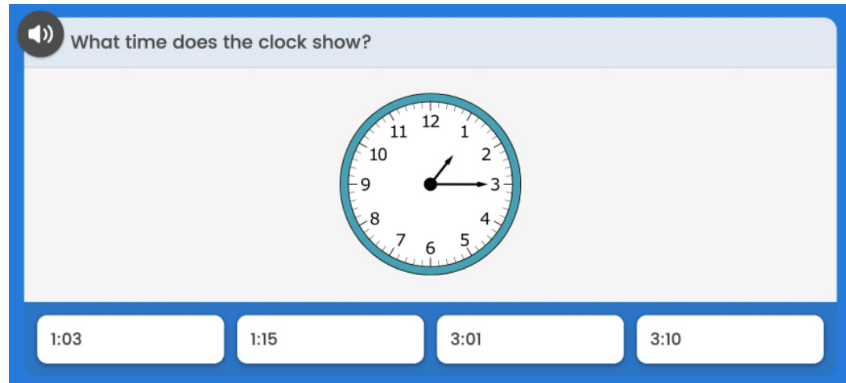
***For specific Live Class guidance, please refer to the *Tactile Support Guidance* located in the Live Class Unit Overviews.

JAWS® is a registered trademark of Freedom Scientific, Inc.

Section 2: Types of Alt Text and Tactile Graphics

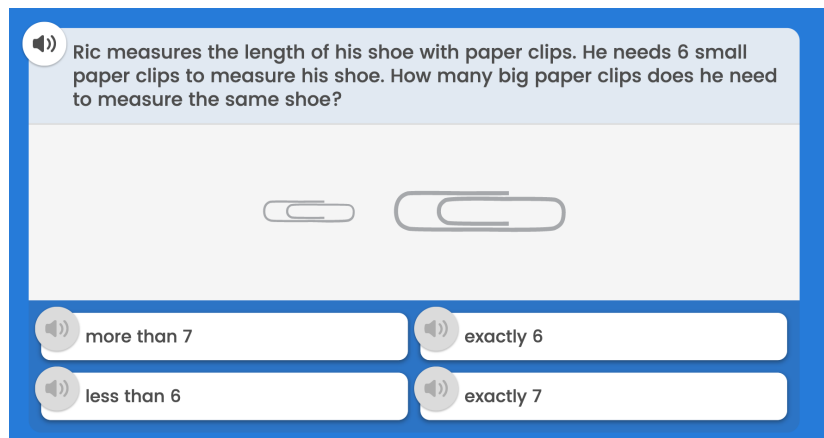
Many items in our digital products include images as stimuli. When the images are necessary to answer the question, they include descriptive alt text. When images are considered decorative or not necessary to answer the question, they do not contain alt text and are coded as silent to screen readers. Below are examples of the three types of alt text students may encounter. Please note the appearance of the items and exact wording of the alt text will vary across products.

1. Alt text that fully describes the image



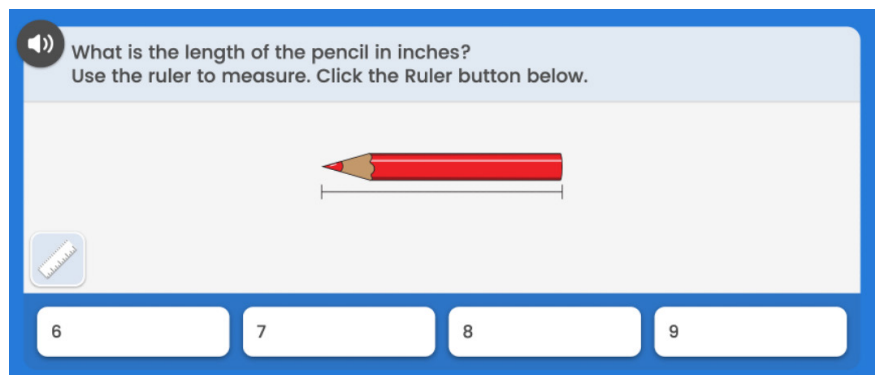
Alt text: The clock. The short hand points between 1 and 2. The long hand points to 3.

2. Alt text that fully describes the image but suggests that a tactile graphic may help to convey the spatial relationships in the image. In this case, the student may request the tactile graphic.



Alt text: A small paper clip next to a big paper clip. A tactile graphic may help with this question.

3. Alt text that requires a tactile graphic. In this case, the image requires students to interpret spatial relationships, and an image description would hint at or give away the correct answer. The student will need a tactile graphic to answer the question.



Alt text: A colored pencil and a line that is the same length as the pencil. Ask your teacher for a tactile graphic.

Note: Images are not final and are subject to change.

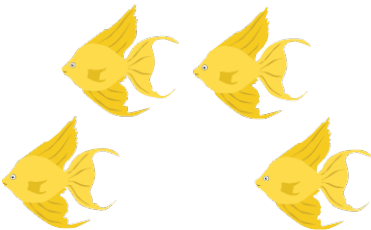
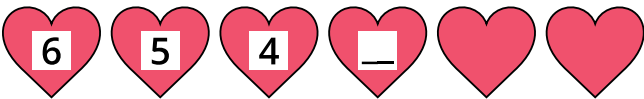
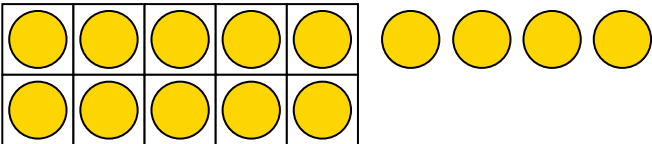
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Section 3: Preparing to Create Tactile Graphics

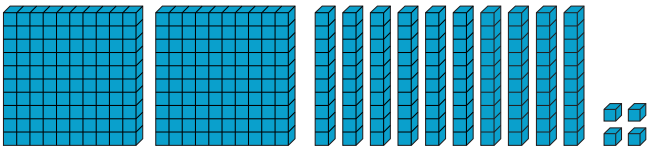
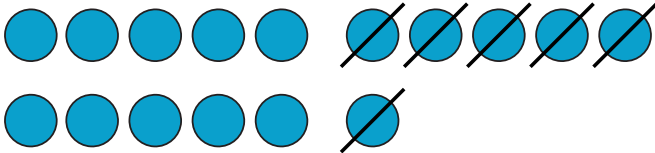
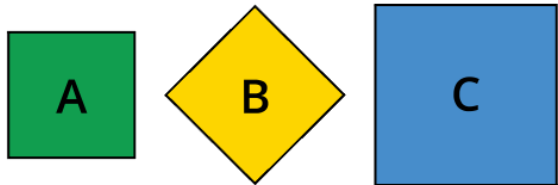
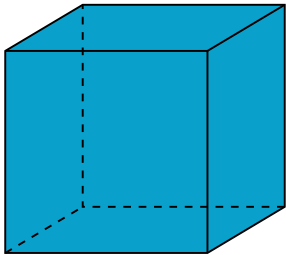
The tables in this document show common images that appear in our digital products and suggest supplies for creating on-demand tactile graphics for similar images. Before the student begins, gather the materials listed for the student’s grade band. Please note, in *i-Ready Inform* students may also get items that are above or below their grade level, so you may wish to review the sample images in adjacent grade bands.

Section 4: Common Images by Grade Band and Content Area

The lists of suggested materials below were produced in consultation with teachers of students with visual impairments. Some are common classroom manipulatives or craft supplies. Others are specialized tools that can be purchased from the [American Printing House for the Blind](#) (APH) with federal quota funds. The materials that are best for each student will vary based on the student’s individual needs and preferences, the resources available, and the teacher’s preferences.

Mathematics (Grades K–2)	
Common Images	Suggested Materials to Create Tactile Graphics
Numbers 60	• Braille labeling tools OR • Math Window®
Objects for Counting or Sorting 	• Stickers or adhesive foam dots in various sizes, shapes, and textures • Paper
Number Patterns with Objects and Blank Spaces 	• Stickers or adhesive foam dots in various sizes, shapes, and textures • Braille number stickers • Paper
Counters in Ten Frames 	• A reusable raised-line drawing of a ten frame • Removable stickers or adhesive foam dots OR • APH Tactile Ten Frames

Mathematics (Grades K–2), Cont'd.

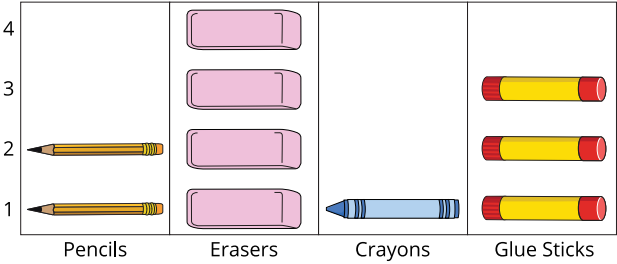
Common Images	Suggested Materials to Create Tactile Graphics
Base-Ten Models for Numbers 	- Base-ten blocks (10 hundred flats, 20 ten rods, 30 unit cubes) - A nonslip surface, such as Dycem®
Objects That Model Computation 	- Stickers or adhesive foam dots in various sizes, shapes, and textures Wikki Stix®, thin graphic art tape, or dried hot glue to show objects being subtracted - Paper
Basic 2D Figures 	- Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat - Braille letter stickers OR APH MathBuilders, Unit 1: Matching, Sorting, and Patterning Manipulative Kit
Basic 3D Figures 	- A set of 3D shape manipulatives, including a sphere, cylinder, cone, pyramid, rectangular prism, cube, and triangular prism - Cardstock or thin cardboard, scissors, and tape to form uncommon 3D solids OR APH MathBuilders, Unit 6: Geometry Manipulative Kit
Real-World Objects That Model 3D Shapes 	Common real-world objects in the form of cylinders, cones, cubes, and spheres (e.g., a ball, a soup can, a toilet paper roll) Note: If the specific object in the item is not available in the classroom, use another object with the same shape.

Dycem® is a registered trademark of Dycem Limited.

Wikki Stix® is a registered trademark and brand of Omnicor, Inc.

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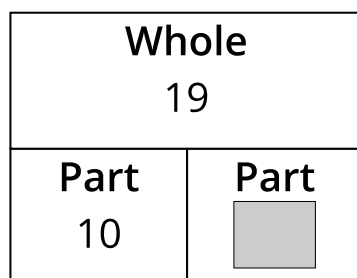
Mathematics (Grades K–2), Cont'd.

Common Images	Suggested Materials to Create Tactile Graphics
Region Fraction Models 	- Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat - Thin graphic art tape or Wikki Stix to emphasize dividing lines - Adhesive textured paper or dried hot glue to represent shaded areas - Scissors
Objects for Measuring or Comparing Length 	- Real-world objects, such as paper clips, crayons, pencils, pens, ribbons, and sticks - Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat - Graphic art tape in various widths - Scissors - Centimeter and inch rulers to ensure the tactile graphic is the correct length (where necessary) - Braille centimeter and inch rulers for the student's use Note: Where possible, use the real-world objects that appear in the image. Alternatively, create simple, solid-line raised outlines of the objects. Graphic art tape may be used to represent rectangular figures.
Picture Graphs with Single-Unit Scale Things in My Desk 	- Raised-line graph paper - Braille labeling tools - Stickers or adhesive foam dots in various sizes, shapes, and textures

Mathematics (Grades K–2), Cont'd.

Common Images

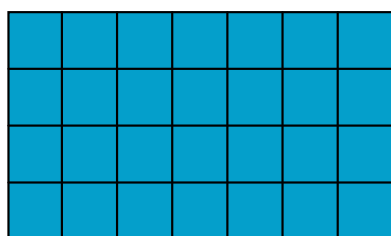
Bar Models



Suggested Materials to Create Tactile Graphics

- Tools to create quick raised-line drawings, such as a tactile drawing board, [APH Quick-Draw Paper](#), or a blunt writing instrument, paper, and a rubber mat
- Braille labeling tools

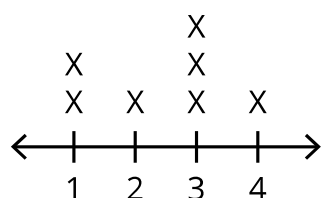
Rectangles Composed of Unit Squares



- Raised-line graph paper
- Scissors

Line Plots with Whole Number Scales

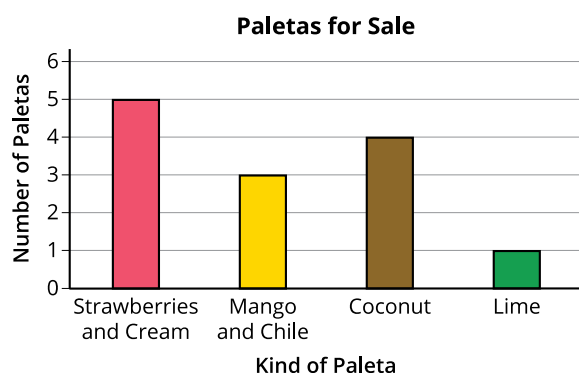
Length of String (in Inches)



- Tools to create quick raised-line drawings, such as a tactile drawing board, [APH Quick-Draw Paper](#), or a blunt writing instrument, paper, and a rubber mat
- Braille labeling tools

Note: Use raised X symbols, not Braille Xs, to represent data points.

Bar Graphs with Single-Unit Scales

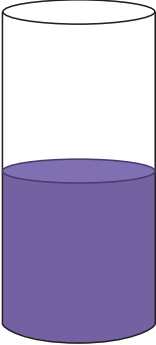


- Raised-line graph paper
- Braille labeling tools
- Adhesive textured paper
- Scissors

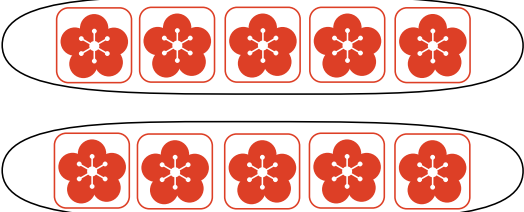
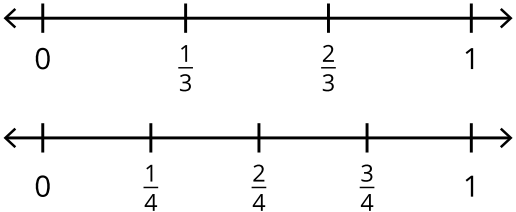
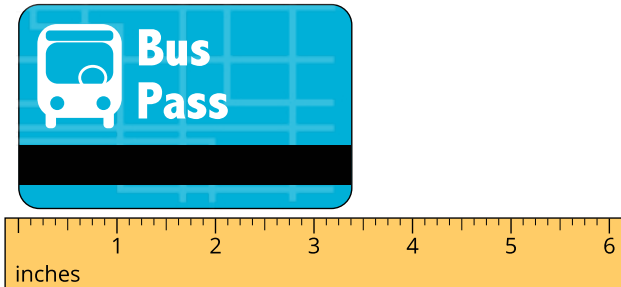
OR

- [APH MathBuilders, Unit 8: Data Collection, Graphing, and Probability–Statistics Manipulative Kit](#)

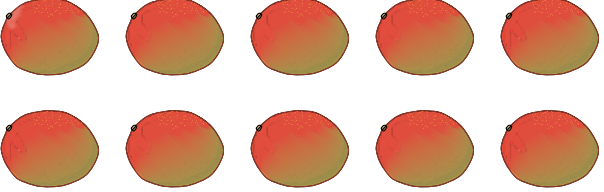
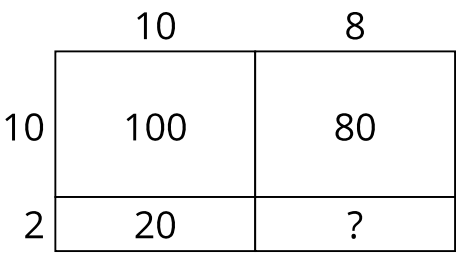
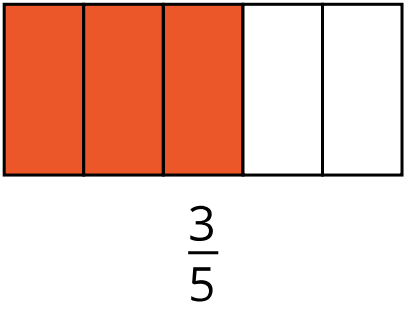
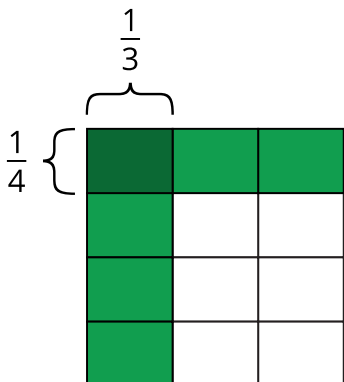
Mathematics (Grades K–2), Cont'd.

Common Images	Suggested Materials to Create Tactile Graphics
Vertical Computation Problems $\begin{array}{r} 93 \\ - 34 \\ \hline \end{array}$ 	• Braille labeling tools • Paper OR • Math Window
Containers Partially Filled with Liquid for Estimating Volume 	• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat • Adhesive textured paper or dried hot glue to represent liquid • Scissors OR • Beakers, cups, and other containers • Water
Coins 	• Real or play coins, including quarters, dimes, nickels, and pennies

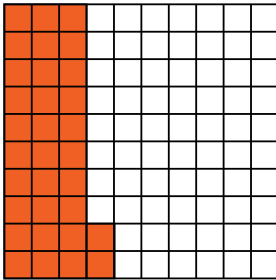
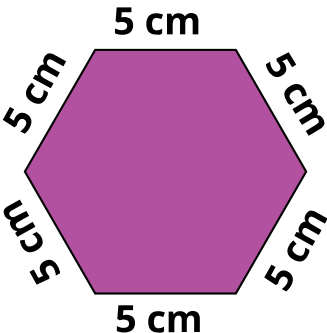
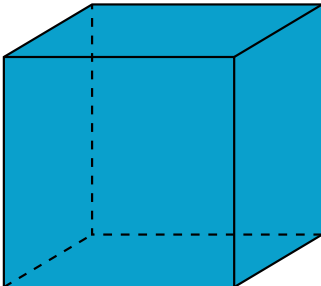
Mathematics (Grades 3–5)

Common Images	Suggested Materials to Create Tactile Graphics
Numbers 71,429,190	- Braille labeling tools OR Math Window
Objects for Counting 	- Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat - Stickers or adhesive foam dots in various sizes, shapes, and textures - Paper
Number Lines That Show Fractions 	- Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat, or graphic art tape and Wikki Stix - Adhesive foam dots to represent plotted points - Braille labeling tools or APH Number Line Device
Objects for Measuring Length 	- Real-world objects, such as paper clips, crayons, pencils, pens, ribbons, and sticks - Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat - Graphic art tape in various widths - Scissors - Centimeter and inch rulers to ensure the tactile graphic is the correct length (where necessary) - Braille centimeter and inch rulers for the student's use Note: Where possible, use the real-world objects that appear in the image. Alternatively, create simple, solid-line raised outlines of the objects. Graphic art tape may be used to represent rectangular figures.

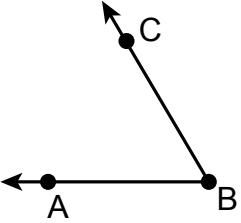
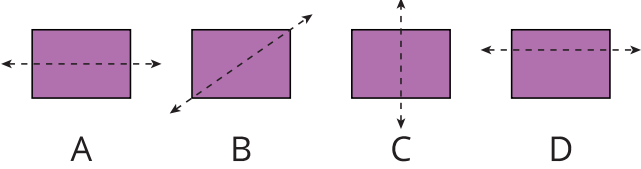
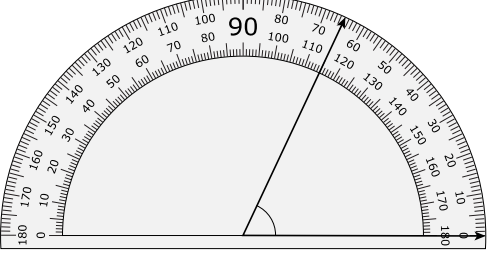
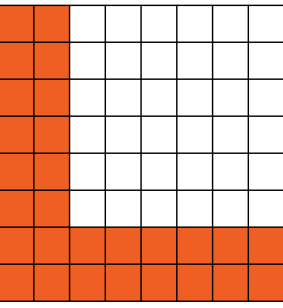
Mathematics (Grades 3–5), Cont'd.

Common Images	Suggested Materials to Create Tactile Graphics
Arrays of Objects 	• Stickers or adhesive foam dots in various sizes, shapes, and textures • Paper
Area Models for Multiplication and Division 	• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat • Braille labeling tools
Region Fraction Models 	• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat • Thin graphic art tape or Wikki Stix to emphasize dividing lines • Adhesive textured paper or dried hot glue to represent shaded areas • Scissors • Braille labeling tools OR • APH MathBuilders, Unit 7: Fractions, Mixed Numbers, and Decimals Manipulative Kit
Region Fraction Models for Multiplication of Fractions 	• Raised-line graph paper • Adhesive textured paper in two textures • Scissors • Braille labeling tools

Mathematics (Grades 3–5), Cont'd.

Common Images	Suggested Materials to Create Tactile Graphics								
Decimal Models (Partially Shaded 10 × 10 Grids) 	• Raised-line graph paper • Raised-symbol stickers to represent shading								
Bar Models Books about animals <table border="1"><tr><td>8</td><td></td><td></td><td></td></tr><tr><td>8</td><td>8</td><td>8</td><td></td></tr></table> Books about people	8				8	8	8		• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat • Braille labeling tools
8									
8	8	8							
Basic 2D and 3D Geometric Figures, with or without Labeled Dimensions  	• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat • Cardstock or thin cardboard, scissors, and tape to form uncommon 3D solids • A set of 3D shape manipulatives, including a sphere, cylinder, cone, pyramid, rectangular prism, cube, and triangular prism • Braille letter and number stickers • Braille labeling tools								

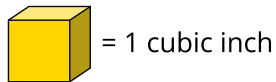
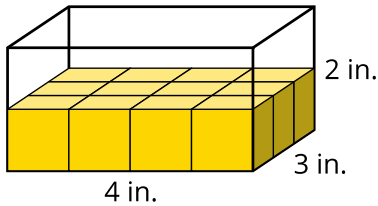
Mathematics (Grades 3–5), Cont'd.

Common Images	Suggested Materials to Create Tactile Graphics
Angles, Lines, and Line Segments, with or without Labels 	• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat, or graphic art tape and paper • Braille labeling tools • A protractor to ensure angles are the correct size (where necessary)
Figures with Lines of Symmetry Drawn 	• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat • Braille letter stickers • Thin graphic art tape or Wikki Stix, if necessary, to emphasize lines of symmetry
Angles Drawn on Protractors 	• A Braille protractor • Adhesive foam dots • Wikki Stix
Rectilinear Figures Drawn on Grids or Composed of Unit Squares 	• Raised-line graph paper • Raised-symbol stickers to represent shading • Scissors

Mathematics (Grades 3–5), Cont'd.

Common Images

Rectangular Prisms Composed of or Partially Filled with Unit Cubes, with or without Labeled Dimensions



Suggested Materials to Create Tactile Graphics

- Plastic linking cubes
- Cardstock or thin cardboard, scissors, and tape to form partially filled prisms
- Braille letter and number stickers or Braille labeling tools and tape

Tally Tables

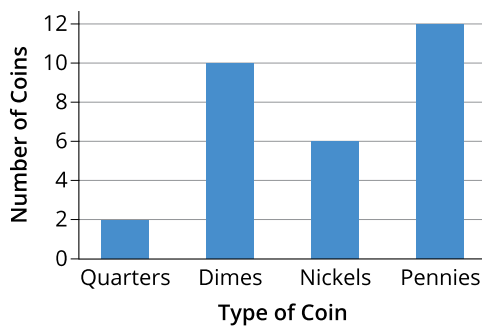
Languages We Speak at Home

Language	Number of Students
Mandarin	
Spanish	
English	
Hindi	

- Tools to create a raised table and raised tally marks, such as a tactile drawing board, [APH Quick-Draw Paper](#), or a blunt writing instrument, paper, and a rubber mat
- [Wikki Stix](#) or graphic art tape and scissors for making tally marks
- Braille labeling tools

Scaled Bar and Picture Graphs

Coins in the Bank



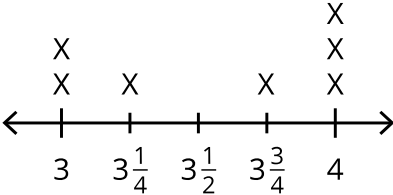
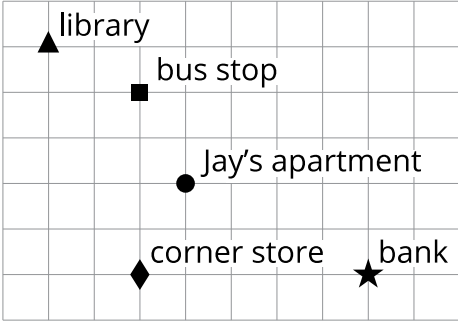
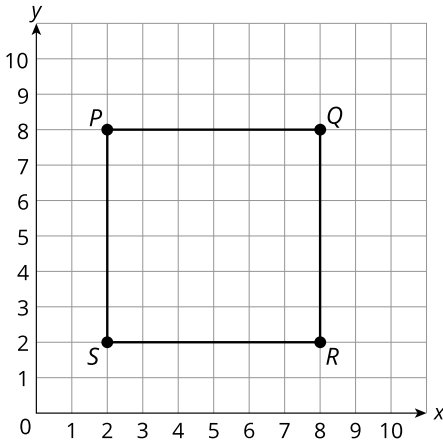
Taco Choices

Al Pastor	    
Carne Asada	
Chicken	   

Key: Each  = 3 tacos

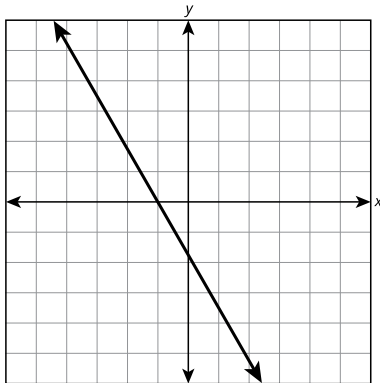
- Raised-line graph paper
- Braille labeling tools
- Stickers or adhesive foam dots in various sizes, shapes, and textures
- Textured adhesive paper to represent bars
- Scissors

Mathematics (Grades 3–5), Cont'd.

Common Images	Suggested Materials to Create Tactile Graphics
Line Plots with Whole Number and Fractional Units Lengths of String (in Inches) 	- Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat - Braille labeling tools Note: Use raised X symbols, not Braille Xs, to represent data points.
Maps on Unlabeled Coordinate Grids 	- Raised-line graph paper - Adhesive foam shapes - Braille labeling tools
Labeled and Unlabeled Points and Polygons Plotted on First-Quadrant Coordinate Grids with Dimensions Up to 10 × 10 	- A reusable, 10 × 10 labeled, raised-line coordinate grid - Removable adhesive foam dots Wikki Stix - Braille labeling tools and removable tape

Common Images

Lines on Simple, Unlabeled X/Y Coordinate Planes



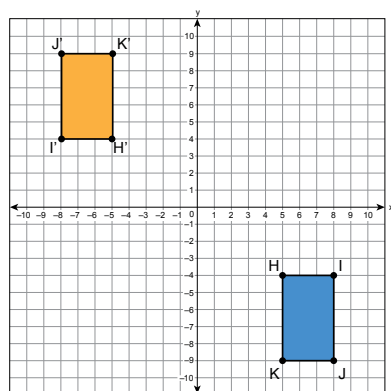
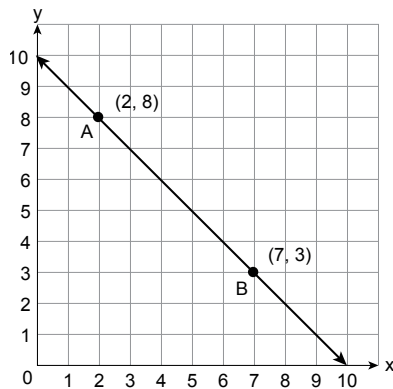
Suggested Materials to Create Tactile Graphics

- Tools to create quick raised-line drawings, such as a tactile drawing board, [APH Quick-Draw Paper](#), or a blunt writing instrument, paper, and a rubber mat
- Raised-line graph paper
- [Wikki Stix](#)
- Braille labeling tools

OR

- [APH Graphic Aid for Mathematics](#)

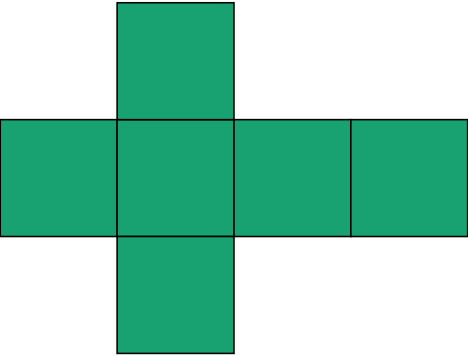
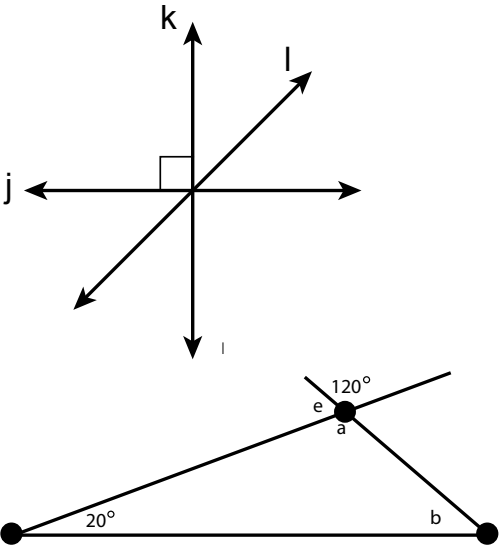
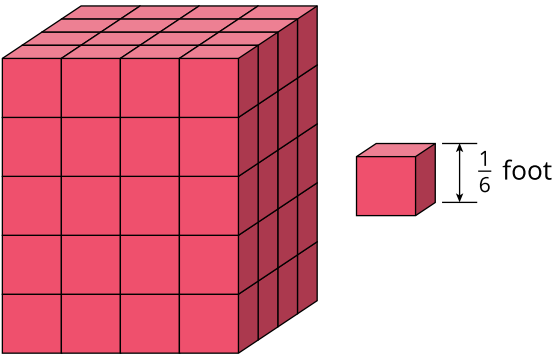
Graphs on X/Y First-Quadrant and Four-Quadrant Coordinate Planes with Varying Scales



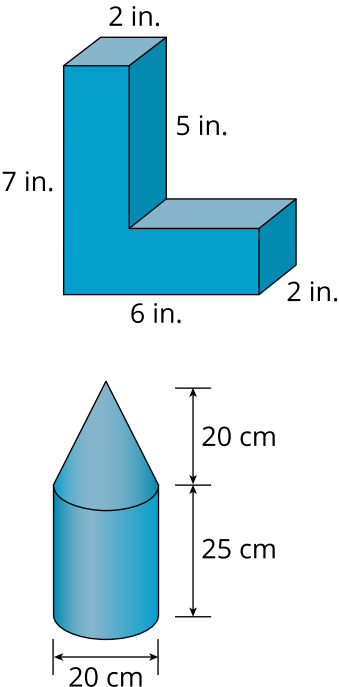
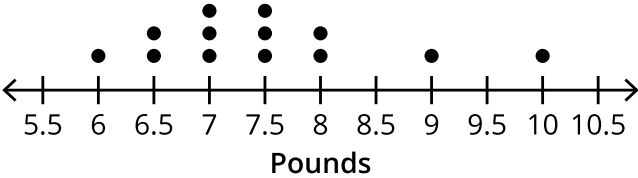
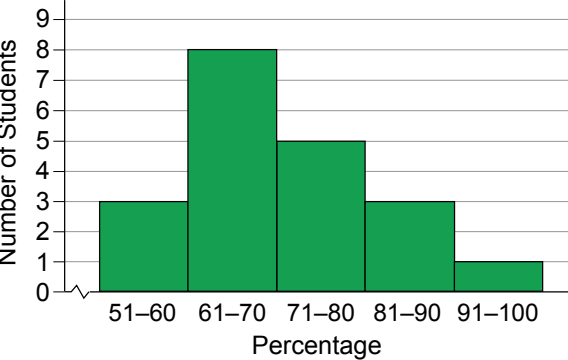
- A reusable, 10 × 10 labeled, raised-line coordinate grid
- Raised-line graph paper to create coordinate grids with other dimensions
- [Wikki Stix](#)
- Removable adhesive foam dots
- Tactile adhesive paper to represent shaded areas
- Braille labeling tools and removable tape
- Scissors

OR

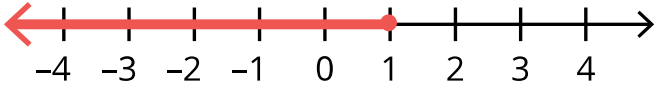
- [APH Graphic Aid for Mathematics](#)

Common Images	Suggested Materials to Create Tactile Graphics
Nets for Solids 	Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat
2D and 3D Geometric Figures, with or without Labeled Dimensions 	- Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat Wikki Stix - Measurement tools (e.g., protractor and ruler) to ensure tactile graphics are the correct size (where necessary) - Braille labeling tools
Rectangular Prisms Composed of Unit Cubes 	Linking cubes

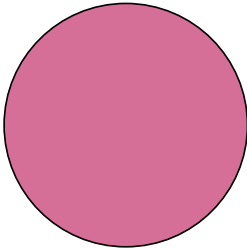
Mathematics (Grades 6–8), Cont'd.

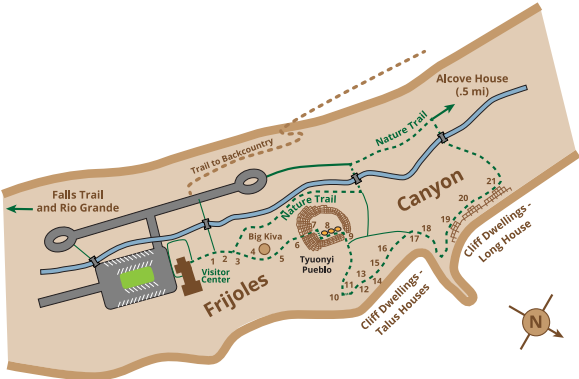
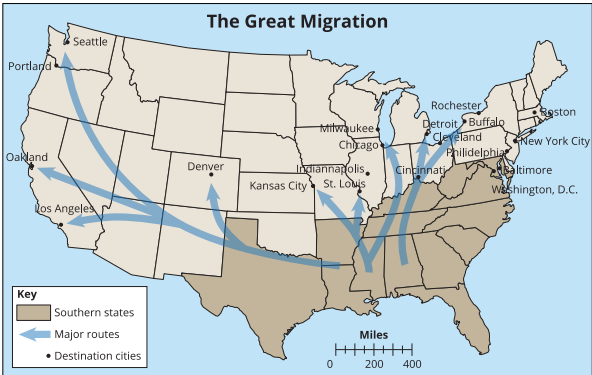
Common Images	Suggested Materials to Create Tactile Graphics
Composite 3D Shapes  The first figure is an L-shaped composite solid. The vertical part is a rectangular prism with a height of 7 in., a width of 2 in., and a depth of 5 in. The horizontal part is a rectangular prism with a height of 2 in., a width of 6 in., and a depth of 2 in. The second figure is a composite solid consisting of a cone on top of a cylinder. The cone has a height of 20 cm and a base diameter of 20 cm. The cylinder has a height of 25 cm and a base diameter of 20 cm.	• A set of 3D shape manipulatives, including a sphere, cylinder, cone, pyramid, rectangular prism, cube, and triangular prism • Cardstock or thin cardboard, scissors, and tape to form uncommon 3D solids • Braille letter and number stickers or Braille labeling tools and tape
Dot Plots and Line Plots with Whole Number and Decimal Scales Infant Birthweights  The dot plot shows birthweights in pounds on a number line from 5.5 to 10.5 with increments of 0.5. The data points are: 6.0 (1 dot), 6.5 (2 dots), 7.0 (3 dots), 7.5 (3 dots), 8.0 (2 dots), 9.0 (1 dot), and 10.0 (1 dot).	• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat • Braille labeling tools Note: Use raised circles or X symbols, not Braille Xs, to represent data points.
Histograms Math Test Scores  The histogram shows the number of students for different percentage ranges of math test scores. The x-axis is labeled 'Percentage' with ranges: 51–60, 61–70, 71–80, 81–90, and 91–100. The y-axis is labeled 'Number of Students' with a scale from 0 to 9. The bar heights are: 3 for 51–60, 8 for 61–70, 5 for 71–80, 3 for 81–90, and 1 for 91–100.	• Raised-line graph paper • Adhesive textured paper • Scissors • Braille labeling tools

Mathematics (Grades 6–8), Cont'd.

Common Images	Suggested Materials to Create Tactile Graphics
Number Lines 	• Tools to create quick raised-line drawings, such as a tactile drawing board, APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat • Wikki Stix or dried hot glue • Adhesive foam dots • Braille labeling tools
Geographic Maps with Scales 	• Textured adhesive paper • Scissors • Adhesive foam dots • Braille labeling tools

Reading

Reading (Grades K–2)	
Common Images	Suggested Materials to Create Tactile Graphics
Simple 2D Shapes 	- Tools to create quick raised-line drawings, such as APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat OR Wikki Stix

Reading (Grades 3–5)	
Common Images	Suggested Materials to Create Tactile Graphics
Maps on Simple, Unlabeled X/Y Coordinate Planes  	- Access to the APH Tactile Graphics Image Library - Tools to create quick raised-line drawings, such as APH Quick-Draw Paper, or a blunt writing instrument, paper, and a rubber mat - Scissors - Various types of textured adhesive paper - Adhesive foam dots - Braille labeling tools Note: In most cases, a simplified version of a map will provide sufficient detail for the student to answer the question(s).

 For more information about *i-Ready's* accessibility features and accommodations, please contact your partner success manager, or visit [our accessibility and accommodations resource hub](#).