Geometry and Tactile Graphics for Students in Grades 3 to 8

Lesson 4: Creating Quick and Efficient Tactile Graphics

PROJECT INSPIRE

University of South Carolina Upstate

Objectives

Participants will be able to:

1. Identify methods, tools, and materials that can be used to create tactile graphics.

2. Understand the importance of the BANA Guidelines when creating tactile graphics.

3. Identify the steps needed to plan and create a tactile graphic.
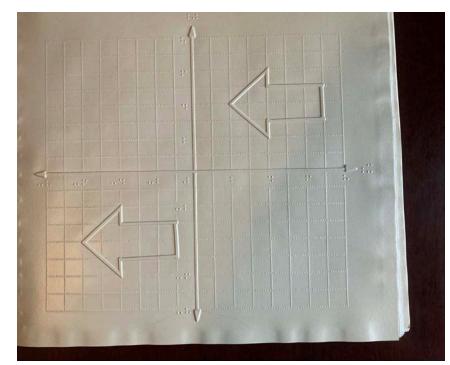
Key Points About Tactile Graphics

- A tactile graphic is a representation of visual information.

- There are multiple ways to produce tactile graphics for braille users.

- The quality of tactile graphics very considerably.

- To be efficient, braille readers must be proficient with different production methods and be able to make inferences to pull from past experiences to increase understanding of content being portrayed.

Different Ways Students will See Tactile Graphics

- Thermoform (plastic feeling)
- Computer generated (e.g., Tiger)
- Microcapsule paper and fuser
- Collage prepared by a person who works in the school and may "do it on the fly". (e.g., for a worksheet)
- Combined embossing and collage
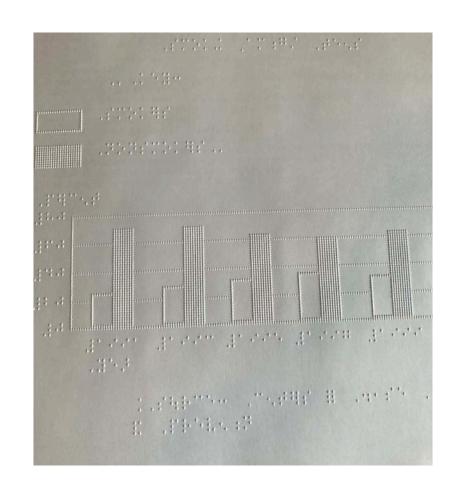- Representations using tools such as the Draftsman

Thermoform

- Often used in textbooks

- Advantages
  - Mass production method that allows for multiple copies.
  - Most readable because of the height and crispness that can be produced.

- Disadvantages
  - Many students don't like the feel of plastic.
  - Most schools don't have it available in the school.
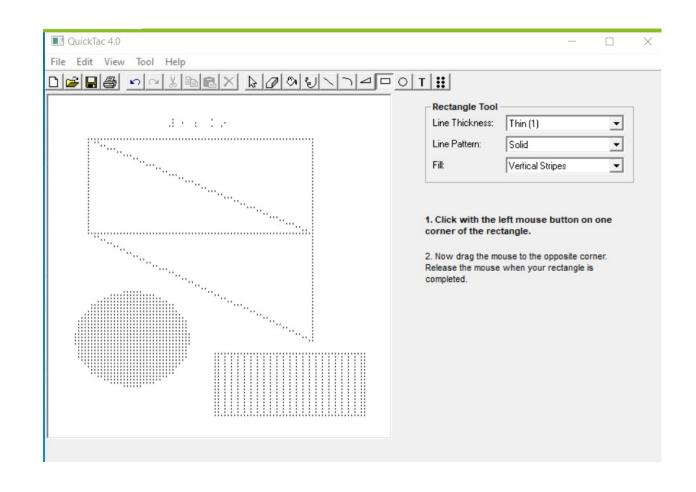
Computer Generated

- Advantages
  - Can save and edit files for future use.
  - Those who don't know braille can be involved in the production.
  - Allows printing of graphs from accessible graphing calculators.
- Disadvantages
  - Software and embosser can be expensive.
  - Higher learning curve (i.e. knowledge of needed settings and properties to accomplish tasks).
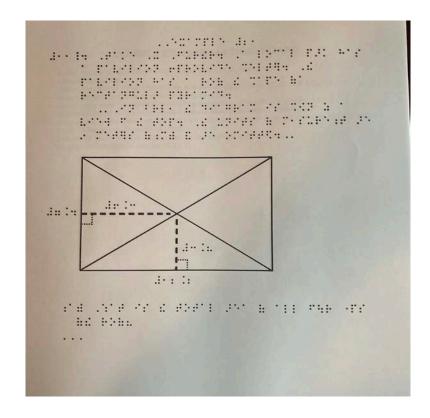 - Little distinction among textures.

QuickTac from Duxbury Systems

- Advantages
  - Free
  - Fast
  - Easy to Use
- Disadvantages
  - Need an embosser
  - Meant for relatively simple graphics

Microcapsule Paper and Fuser

- Other names: "Toaster," PIAF, Swell Form machine, Tactile Image Enhancer

- Advantages
  - Can make multiple copies
  - Quick to use
  - Machine is inexpensive compared to other options
  - Gives crisp angles and geometric shapes

- Disadvantages
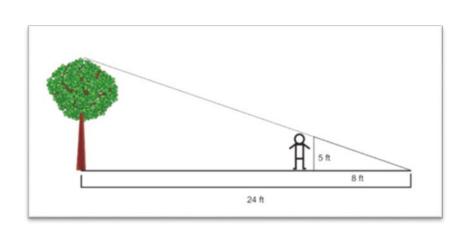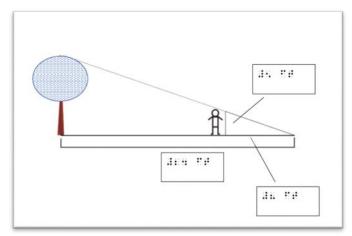 - Paper is expensive
  - Not a lot of options for texture

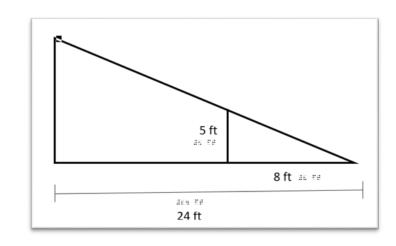# When Preparing a Drawing for the Fuser and/or Computer

- Use the proper braille font.
  - Swell: Size 28 Swell Braille font (TSBVI resource page) for the fuser
  - Computer generated: Use the font and software specific for the embosser
- Insert the drawings into Word or another program that allows you to manipulate it.
- Consider the weight (thickness) of lines, textures, lead lines, position of labels, etc.

Reworking an Image for Clarity

- Look at what the "important" components of the drawing are.
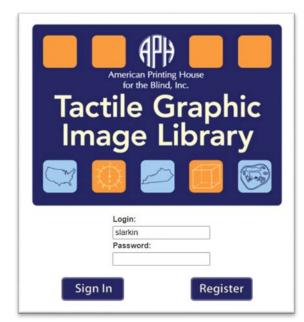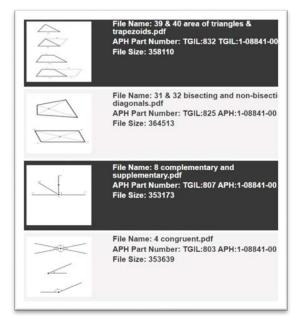- Revise/draw the graphic to simplify the content and make it tactually clear for the braille reader.

Watch the "Preparing a Tactile Graphic for the Tiger" video that accompanies this lesson.
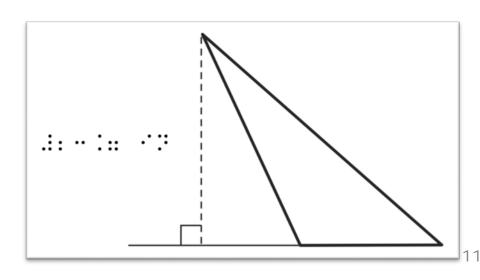
APH Tactile Graphics Image Library

- Free to register

- Different topics including geometry

- Download the PDFs, which are ready to print, and print on microcapsule paper.

- If you're careful, do a screen clipping of the image and bring it into a program such as Word to add braille.

  - Use the Swell braille font

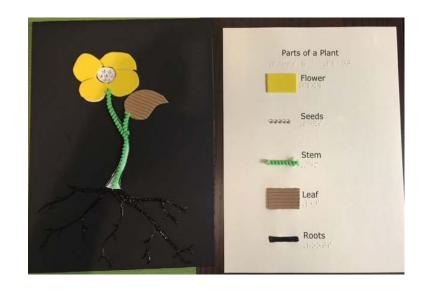Watch the "Tactile Graphics Image Library" video that accompanies this lesson.

"Do it on the fly" Collage

- Advantages
  - Can individualize to student needs and preferences
  - Ability to use a variety of textures
- Disadvantages
  - A lot of prep time, including drying, for a short period of use
  - Requires lots of planning and materials
  - Tendency for the tactile graphic to become too complex due to use of too many textures
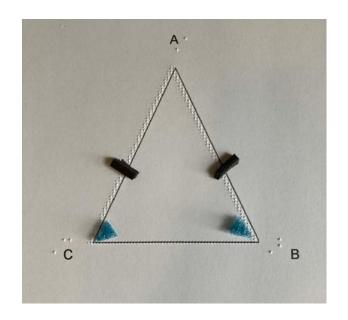 - Not generally used on textbooks and assessments
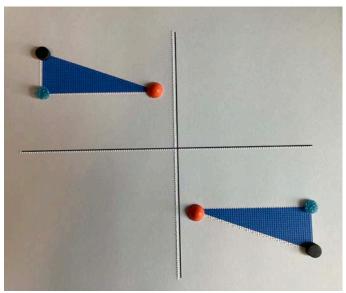
Combined Embossing and Collage

- Advantages
  - Allows you to get the best of both embossing and collage
  - Braille uses the correct height and spacing

- Disadvantages
  - Requires planning time so that everything fits in the spaces
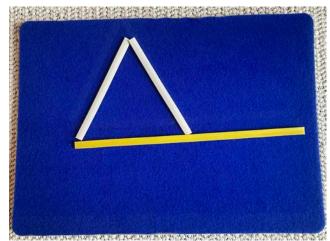 - Easy to have too much clutter

Commercial Tools Such as Draftsman, TactileDoodle, inTACT Sketchpad, Wheatley

- Advantages
  - Fast
  - Easy to use
- Disadvantages
  - More difficult to add braille labels
  - Only one height of lines

When to Develop a Tactile Representation of Visual Information

- Information is new to the student.

- Understanding of the information is critical to understanding the bigger concept.

- Information is not adequately described in the printed material.

- The information will be used in a variety of ways over a period of time.

- The object being shown is too small, large, or dangerous to touch.

Keep in Mind…

- Tactile materials are an alternative to, but not a complete substitute for visual materials.
- Keep it simple, eliminate confusing details when possible.
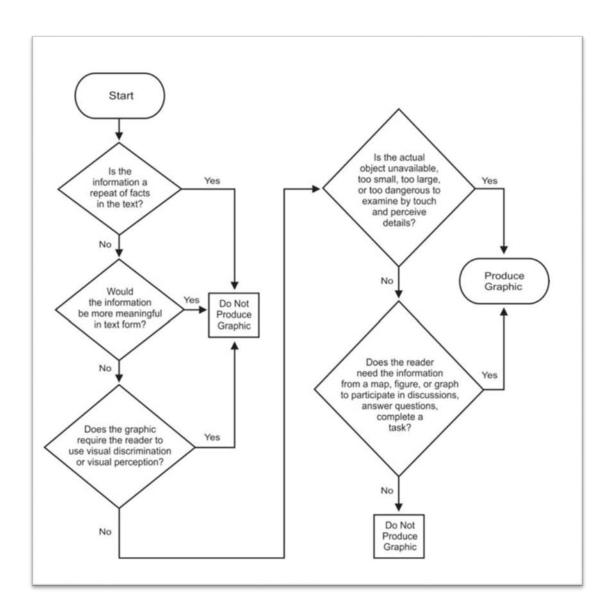- Examine your graphic with your fingertips to decide whether it is legible or not.

BANA

- *Guidelines and Standards for Tactile Graphics, 2010*
  - Hard Copy available in print or braille from APH
  - HTML (online searchable) or download PDF

- *Guidelines and Standards for Tactile Graphics, 2010, Supplement*
  - Print version has information in print and graphics in braille.
  - Braille version has both the information and the graphics in braille.
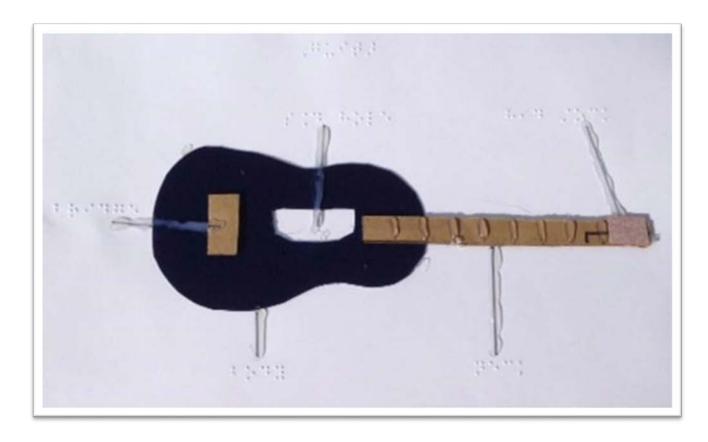
Decision Tree

- Developed by Lucia Hasty
- Not every visual representation requires a tactile representation
- Provides you a guide for making decisions
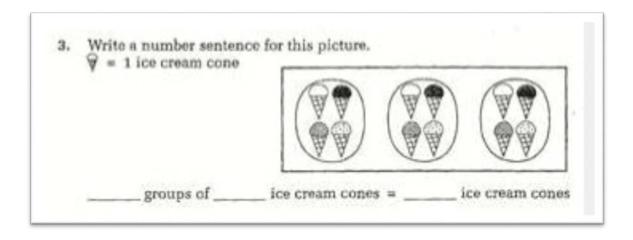
Designing Using the Collage Method

- Use tactually distinct textures and a variety of tools to produce graphics.

- When you look at a drawing divide it into areas, lines, and points.

- Spend time planning the graphic

- It doesn't have to be pretty, but it does have to be tactually clear to the reader!

- Get input from the tactual reader to guide you in preparing future tactual graphics for them.
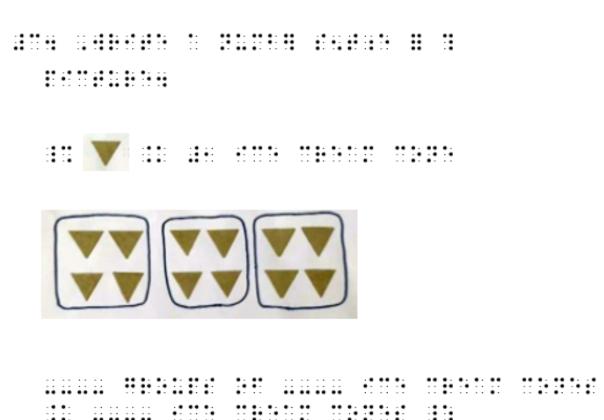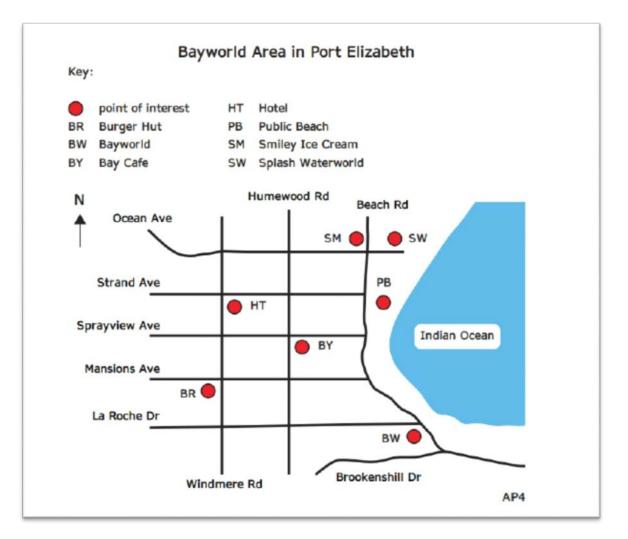
Experiment and Check in with Your Reader

The lead lines with hot glue were "too strong" for the tactile reader and there was not an 1/8 inch between lead lines and other elements.
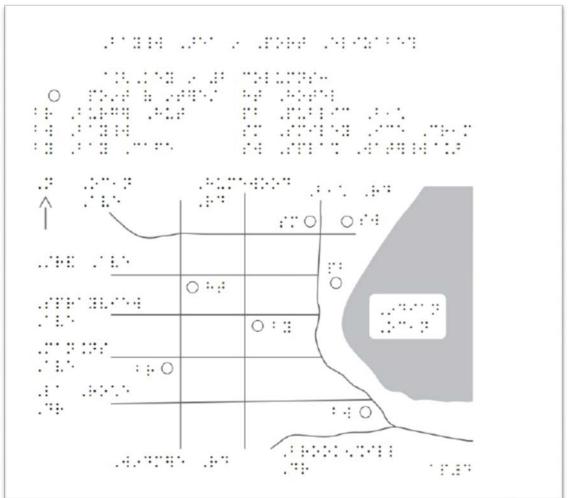
Simplify the Image

3. Write a number sentence for this picture.

🍦 = 1 ice cream cone

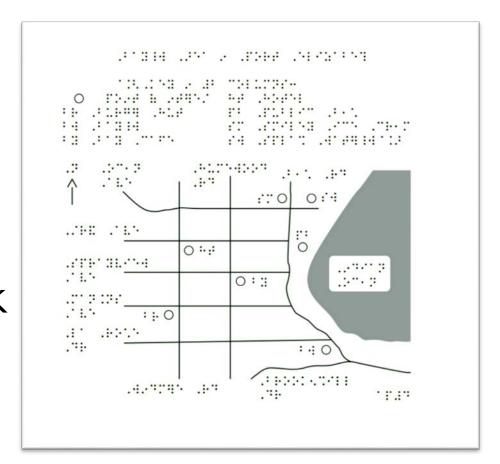_____ groups of _____ ice cream cones = _____ ice cream cones
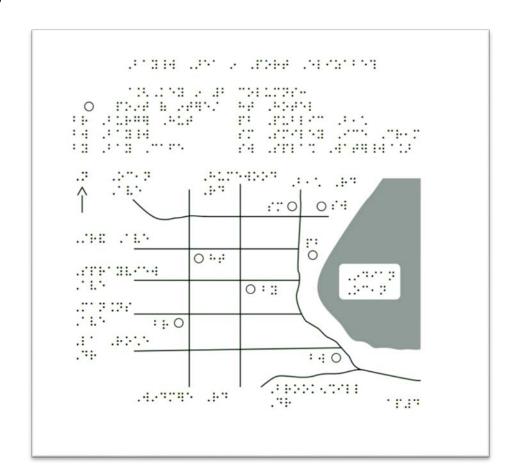
Breaking Down an Image

Areas

- Use textures sparingly. A lot of times a label (identified in a key) works.

- Don't have too many "loud" textures.

- If you have multiple areas think about adding a line to separate them, but be careful the reader isn't looking for the meaning of the line.
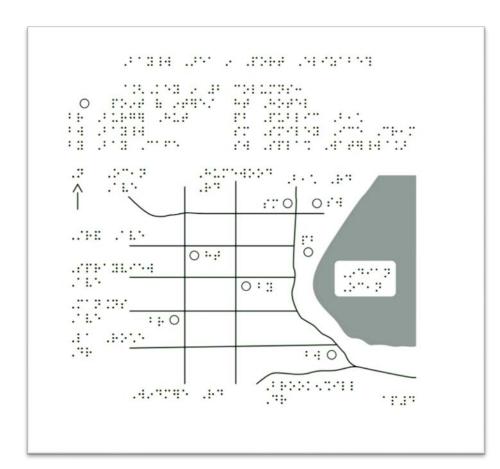
Lines

- Choose lines that feel distinctly different.

- Use a solid line and a dotted line for contrast.

- No more than 4-5 types of lines per graphic.

- Leave a 1/4" to 1/8" between lines and labels

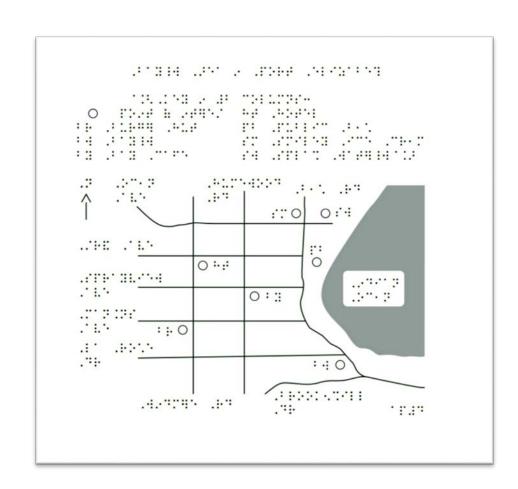- A line must be at least ½ inch long to be included.

Points

- Leave at least 1/8" between the point and anything surrounding it.

- Open points are clearer to the tactile reader.

- APH has Feel 'N Peel stickers you can use for points and other symbols.

  - Caution: Don't put your points over lines or labels.

- APH Graph Benders has tactile triangles, squares, and circles made of two textures – foam and pool noodle material

Titles, Keys, and Labels

- Include the title at the top of the page.
- Use a key or legend **before** the graphic. Keys begin and end with transcriber's note symbol.
- Labels
  - Preplan labels
  - Place labels going horizontally, not vertically or on a diagonal
  - Have an 1/8 inch between labels and other elements (e.g., a line).

Preparing the Key

- The key is formatted as a transcriber's note and list.

- The key includes a sample of the line, point, or region and what it is representing. Put the line, point, or region before the term.

- Group symbols: for example, all areas, all lines, all points, all abbreviations.

- BANA has a list of two cell abbreviations (e.g., NA = North America, TD = Chad) - One of the cells must have a dot 1 or 4.