# Adobe Illustrator for Tactile Graphics

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# Basic Principles

* Make the tactile graphic as clear as possible. Always keep in mind the point of view of the braille reader. It is up to the producer to present the information in a clear, concise manner for the student.

* Know the important facts to be kept in mind when creating the graphic.

* Determine if the original shapes and textures are necessary to convey the concept, or can simple geometric shapes or braille signs be used to illustrate the concept.

* Omit unnecessary parts of the diagram (i.e. unreferenced or irrelevant sections of a map) so that the original shapes and textures can be presented on a larger and clearer scale.

* Keep in mind the knowledge level, skill base, and age level of the reader. Use age appropriate language.

* Determine if the text requires measurements to be made or an operation to be performed, or if the original shapes, textures and total form are necessary to convey the concept. If so, the lines and angles are reproduced retaining a proper scale.

* Remember to keep it simple; unnecessary information, clutter, may prohibit the student from gaining relevant information therefore making the graphic useless.

* Edit/proofread the graphic with your fingers, not your eyes, before showing it to a student. Beware, if someone says your graphic is "pretty" or "beautiful", take a second look, your student may not be able to understand it at all.

Source: *American Foundation for the Blind Braille Literacy Mentors in Training: The Next Generation - Teaching Special Codes: Nemeth, CBC, and Tactile Graphics* - Workshop in Fremont, California (August 7-9, 1997) and Atlanta, Georgia (September 11-13, 1997). Diane Spence and Susan A. Osterhaus

"A picture is inevitably changed by being transferred to a relief image. To be intelligible buy tactile means, it has to be distinct and its form logically simplified. It has to be produced in such a way that every component of its form is distinct and easily identifiable."

"[S]imply producing images in a relief is not enough: for tactile interpretation, they have to have a plain and simple form."

Source: *From a talk presented at the 65th IFLA Council and General Conferenc , Bangkok, Thailand, August 20 - August 28, 1999, by Yvonne Eriksson, The Swedish Library of Talking Books and Braille: How to make tactile pictures understandable to the blind reader*

# Guidelines for Design
# of Tactile Graphics

## General

1. Decide if a tactile graphic needs to be made at all. Omit the graphic if it doesn't convey essential content.
    a. Consider using a description to replace all or part of a graphic.
    b. Remember that children need to build up tactile skills with simple figures. Consider providing graphics in children's books even if they are not needed for content.
2. Graphics should be tactually clear and contain only relevant information, based on an understanding of what is being taught and what the student's task is. Visual information that is irrelevant to the meaning or purpose should be omitted.
3. Graphics should be redrawn in 2 dimensions where possible, with the exception of some mathematical and scientific diagrams.
    a. Replace 3-dimensional figures with cross-sections or front-side-top views whenever possible.
    b. Look for perspectives that allow you to redo a 3-D print picture in 2-D.
4. Follow the Braille Authority of North America's (BANA) "Guidelines for Mathematical Diagrams." In cases where a graphic has been replaced by a table or chart, use "Braille Code for Columned Materials and Tables."

## Design

1. Avoid clutter and simplify.
    a. "Clutter" occurs when different symbols and lines are so close or so similar that they become hard to distinguish. Spacing is the key to avoiding clutter.
    b. Symbols and lines closer that 1/4" may be hard to tell apart, depending on the medium and tools being used.
    c. Shapes with sides less than 1/2" long may not be recognizable.
    d. Distort the spacing or shape of the original picture if necessary to allow uncluttered spacing of the tactile elements, providing this would not violate the purpose of the picture.
    e. "Simplify" means to eliminate unnecessary elements of the original picture. Focus on the relevant parts and omit details that are purely decorative or distracting.

f.  When the print picture includes people, animals, objects, etc., replace them with simple lines, symbols, and/or labels (e.g., use the label "hand" instead of drawing a hand).
2.  Split complicated graphics into separate drawings showing layers of information, or into an overview and detailed view.
    a.  Explain the separation in a transcriber's note.
    b.  Carry over some labels and common points from one drawing to another for reference.
3.  In general, use texture sparingly and only to add information.
4.  When necessary to avoid confusion or to give important information, differentiate between bodies of water and land on maps by using a different areal symbol (texture).
    a.  Use a very low, closely spaced texture for water.
    b.  An areal texture indicating ocean should extend far enough to be perceived as a continuing expanse, but need not fill the entire page.

## Symbols (Lines, Points, and Textures)

1.  Limit the lines, points, and symbols on a drawing to ones that can be easily identified one from another by touch.
    a.  Use the most prominent symbols for the most important features in the graphic. Don't allow high or "noisy" textures to draw attention away from the key features.
    b.  Feel the copy of the graphic the reader will receive to see if you can follow all lines.
2.  Be consistent in using symbols within graphics of the same type within the same transcription (e.g., always use the same symbol for water on maps).
3.  Use different tactile symbols for different types of information (e.g., in a map of the United States, the tactile line used to indicate state borders should be different from the tactile line used to indicate international borders).
4.  Lines, points, and braille must be physically separated by at least 1/8".
    a.  This may need to be 1/4", depending on the medium and symbols used.
    b.  Apply the 1/8" separation rule to all features that are separate, even if doing so introduces some spatial distortion.

## Lead Lines

1.  Use lead lines only as a last resort. Use keys or notes as alternatives.
2.  Do not use arrows as lead lines.
3.  The linear symbol used for lead lines should be different from any other lines used in the graphic and should be tactually distinctive but less prominent.
    a.  A lead line should begin as close as possible, without causing interference, to either the first or the last letter in the label, and should end as close as possible to the feature being labeled.
    b.  Break the lines of the graphic to allow lead lines through.

## Labels

1. Explain and define all graphic symbols, either on the same page, facing page, or special symbols page.
2. Identify all important features (e.g., capitals, bodies of water, etc.) of the graphic, even things not labeled in the print version. Place titles at the top of the page. Do not make unlabeled graphics. (There may be exceptions in some testing situations.)
3. Place labels in a manner that leaves the reader no doubt as to what is being identified. Single letters on the graphic should be preceded by either the letter sign or the capital sign.
4. Use two-letter U.S. postal codes where applicable (and other two-letter codes where postal codes are not applicable) for labels on maps.
5. Words in labels need not be capitalized if their meaning will not be confused.
6. Use Grade 2 braille contractions in labels.
7. A two-cell braille symbol is preferable to a one-cell symbol for labels.
8. Try not to break the integrity of a shape with a braille label (e.g., the border of a state with its braille label).

## Indicators and Scale

1. In a transcription where north is at the top of the page on all maps, indicate this in a preface and do not indicate north on each map. On single maps, or when north is not the top of the page, indicate direction by using a simple arrow labeled N.
2. Position scale and other indicators as consistently as possible, preferably at the top of tactile graphics.
3. When it is necessary to change the scale, this fact may need to be indicated in a transcriber's note.

## Preliminary Information

Place all titles, keys, and legends before the graphic. Author's keys and legends precede the transcriber's keys and legends. If there is not room on the page with the graphic, place on preceding page.

Remember: Feel every graphic you make before sending it on. If you can't identify its features, your reader probably can't either!

The preceding guidelines were developed out of an APH workshop involving Nancy Amick, Jane Corcoran, and APH staff in July 1997.

APH, 1997

# A Good Tactile Graphic

## Tactile Graphic Definition

Tactile diagrams are **tactile interpretations** of what is to be conveyed, not merely raised pictures.

## Characteristics

### It can be read with ease.

* It makes sense!
* Boundaries can be found easily and are clearly distinguishable.
* The most important elements in the graphic are the most tactually significant.
* All elements can be clearly distinguished.
* There is no unnecessary "clutter" to confuse the reader.
* Textures do not interfere with elements inside or near them.
* The scale is appropriate to the elements depicted.

### It fully communicates the author's intended message.

* Accurately convey the author's work.
* Separate the "form" from the content and give the content new form if it will help to convey the meaning.

### It is well-suited to its intended audience.

* Pay attention to the experience of your reader.
* Use the appropriate grade of Braille for your reader.
* Be aware of whether the reader will be working alone or with assistance.

### It never compromises tactual quality for visual attractiveness.

* Don't worry about making the graphic visually attractive.
* Sacrifice visual detail for clarity.
* Always focus on the content over looks.

# Planning Process

## Gather critical information.

### Talk to your reader.
* Know your reader's skill level with using graphics.
* Know your reader's Braille skills.
* Know your reader's needs--how will the graphic be used? what is its purpose?

### Determine your means.
* Find out what resources you have for producing graphics.
* Remember to check on-line resources for the graphic you need.

    Alternate Media Exchange (AMX): http://exchange.htctu.fhda.edu:591/intro.html

    Braille Institute: www.brailleinstitute.org/BPTactileGraphics.html

    Louis Database: www.aph.org/louis.htm

    TAEVIS: www.taevisonline.purdue.edu/

    TSBVI: www.tsbvi.edu/

### Study the content.
* Figure out what information the graphic is intended to convey.
* If the image just reinforces the content and does not provide new information, it may not be needed.
* Remember, a graphic that just serves as a visual "summary" or "simplification" performs neither task for a blind person and is not necessary.

### Talk to the teacher.
* Attempt to convey to the teacher the challenges of tactile graphics for the student and get his/her input on which graphics convey necessary information.
* Use the teacher as a resource to help you understand the graphic and its purpose.

### State the purpose.
* After gathering information, state the purpose of the graphic in your own words.

# Plan your adaptation.

## Do you need the graphic?

* Decide what portion of the information needs to be tactile and what portion in words (transcriber's notes).

* Remember, sometimes a verbal/written description of the graphic may be the best choice.

## How will you adapt the graphic?

1. List each required element.
2. Rank the elements in importance (use the star system).
3. Next to each element, list the symbol or graphical element that you are going to use.
4. Determine what Braille elements you will need: title, key, labels, transcriber's note.
5. Check to see what space you will need for the Braille elements.
6. Decide if you can use the same view in which the graphic is shown or whether you need another or a different vantage point, e.g., side view, top view, etc.

# Produce your tactile graphic.

## What will you use to create the graphic?

* Decide what you will use to create your graphic: P.I.A.F, Thermoform, TGD Pro with Duxbury.

* Will you scan the graphic to a TIFF file and modify it or start from scratch?

# Test your work.

* Close your eyes and test your graphic.

* Have your student test the graphic.

* Teach yourself to be more tactually aware and gather tactile impressions to aid in your work.

Note: The preceding section is based on the principles depicted in the videos from American Printing House for the Blind (www.aph.org).

# Tips

* Focus on the important elements of the graphic.

* Use the most prominent symbols for the most important features.

* Use lines, points, and symbols that can be easily distinguished by touch.

* Only use texture when it's needed to convey information.

* Try to space symbols and lines at least 1/4 inch apart.

* Space lines, points, and braille at least 1/8 inch apart.

* Make shapes at least 1/2 inch on a side.

* Distort shape and spacing if needed, as long as they don't affect meaning.

* Avoid connecting labels with lines.

* If you must use connecting lines, do not use arrows.

* Make sure connecting lines are different from any other lines.

* Do not place a label over a line that forms a shape in the graphic.

* Break the line of the graphic to allow connecting lines through.

* Keys and legends should precede, rather than follow the graphic.

## Organizing Your Graphic

| | |
|---|---|
| Student's name: | Text book |
| Experience with graphics: | Teacher's name |
| Skill level with braille: | Teacher contact info: |
| Purpose of graphic | Graphic page number |

| Required element | Rank | Symbol |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Braille required**

Title:

Labels:

Key:

Transcriber's note:

# ASCII Braille Table

| a | b | c | d | e | f | g | h | i | j |
|---|---|---|---|---|---|---|---|---|---|
| a | b | c | d | e | f | g | h | i | j |

| k | l | m | n | o | p | q | r | s | t |
|---|---|---|---|---|---|---|---|---|---|
| k | l | m | n | o | p | q | r | s | t |

| u | v | x | y | z | & | = | ( | ! | ) |
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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
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