

# **ACCESSIBILITY IN PRINT**

## Best Practice Guide

*Prepared by Alta Planning + Design | 11.21.19*



# Overview

This report seeks to answer the question: How do you design print materials that are accessible and inclusive for the widest possible array of people? This report presents research on graphic design principles that can make print products more accessible for people with visual impairments and other disabilities, as well as Limited English Proficiency, and low-literacy populations.

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# **Accessibility Considerations**

# Reading Comprehension

## OVERVIEW

**Not everyone in the United States reads English at the same level. It's important to consider the following factors when creating content for the audience you want to reach.**

## ILLITERACY AND LOW LITERACY

According to the U.S. Department of Education and the National Institute of Literacy, roughly 32 million people in the United States can't read. (That's 9% of the population). In addition, the National Center for Education found that 19% of adults can't read

a newspaper, let alone complete a job application. And the Organization for Economic Cooperation and Development found that 50% of all adults in the United States can't read a book written at an 8th grade level.<sup>1</sup>

## DYSLEXIA

Dyslexia is a language-based learning disability that affects reading, writing and language comprehension.<sup>2</sup> The condition can be more or less severe for different people. Roughly 15 to 20% of the population is dyslexic, making it the most common language-based learning disability.<sup>3</sup>

## LOW ENGLISH PROFICIENCY

Although proficient in their native language, some individuals who speak English as a second language may have a low English proficiency level. According to a study by the Migration Policy Institute, 22% of the U.S. population over the age of 4 speaks a language other than English at home.<sup>4</sup>

# Visual Impairments

## OVERVIEW

**Not everyone sees things in the same way. It's important to consider the following factors when creating content for print materials.**

## LOW VISION

Visual disabilities and low vision affect 2.3% of individuals ages 16 and older. Low vision can refer to limited vision in one or both eyes. These impairments can include: hazy vision, blurred vision, obstructed vision, blind spots, tunnel vision, light sensitivity and the inability to see in the dark.<sup>5</sup>

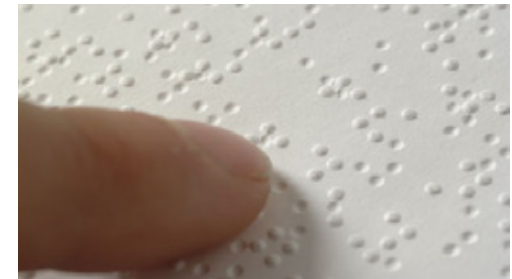
Sometimes low vision cannot be corrected with eye glasses or contact

lenses. In these instances, people with low vision may use aides, including optical and non-optical devices, to help them process visual information.<sup>6</sup>

## BLINDNESS

Blindness is the lack of sight. This can vary from partial blindness to complete blindness. A person is considered legally blind when the vision in their better eye can't be corrected to 20/200. In 2009 it was estimated that more than 1.3 million people in the United States were legally blind.<sup>7</sup>

People who are blind may read using Braille or use devices that translate written word into audio.



Close up of a person reading Braille (above);<sup>8</sup> a person with low vision uses a handheld device to help magnify words (below).<sup>9</sup>

## COLOR DEFICIENCIES

Color vision deficient (sometimes known as color blind) people have difficulty distinguishing between colors. Color vision deficiency impacts 4.5% of the population.<sup>10</sup>

Men are genetically more predisposed to being affected by color deficiencies than women. 1 in 12 men (8%) are color deficient whereas 1 in 200 women (0.5%) are color deficient.<sup>11</sup>

There are different forms of color blindness.

**Protanopia** (or Protanomaly) is a missing or malfunctioning L-cone; it is the second most common type of color deficiency. Protanopes are

unable to perceive red light.<sup>12</sup>

**Deuteranopia** (or Deuteranomaly) is a missing or malfunctioning M-cone; it is the most common type of color deficiency. Deuteranopes are unable to perceive green light.<sup>13</sup>

**Tritanopia** (or Tritanomaly) is a missing or malfunctioning S-cone; it is fairly rare. Tritanopes are unable to perceive blue light.<sup>14</sup>

**Achromatopsia** (monochromacy) is the most rare form of color deficiency. Achromatopes can see no color at all.<sup>15</sup>



*Full-color vision*



*Protanopia*



*Deuteranopia*



*Tritanopia*



*Achromatopsia*

Example of how color deficient individuals might perceive different colors.<sup>16</sup>

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# **Audience Considerations**

## Who are you trying to reach?

### COPYWRITING

For any audience, writing text that is simple and direct can help with comprehension. Use clear and concise sentences that get directly to the point.

For information on simple text visit: [www.plainlanguage.gov](http://www.plainlanguage.gov).

Avoid using technical, jargony or complex text. Don't use long or complicated words.

Use an active voice when possible and avoid the use of passive voice.

Keep content neat and organized. Use headers to break up chunks of text. For best practices on hierarchy and organization, see page 12.<sup>17</sup>

### SUPPLEMENT WITH GRAPHICS

In order to reach a larger audience and to make the content easier to understand, consider supplementing text with graphics. Photographs, illustrations, icons, lists and tables can supplement written content.<sup>18</sup> People with low literacy, reading disabilities, or who speak English as second language may especially benefit from this. Be sure to use images and illustrations that your intended audience can identify with.

For best practices on incorporating graphics with text, see page 19.

#### Active voice:

Community members enjoyed the annual neighborhood picnic.

#### Passive voice:

The annual neighborhood picnic was enjoyed by community members.

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An active voice is more direct and to the point, placing the subject at the beginning of the sentence. Passive voice can be indirect and confusing. For accessible copy, use an active voice whenever possible.



## What alternate formats should be considered?

Å ğ Ĥ ; ø Л ä  
 Ғ Ж í î Ñ É Ω

The above characters are examples of Latin and Cyrillic glyphs in Myriad Pro Bold. Although these specific glyphs may not be used in English, they are used in other languages. If text is going to be translated, choose a typeface with a robust glyph palette.

هذه هي اللغة العربية.

这是中国人。

These two sentences are examples of Arabic text (above) and Simplified Chinese text (below). These non-Latin / non-Cyrillic based letters are not available in standard typefaces. Myriad Arabic Bold and Source Han Sans CN Bold have been used in these examples.

### TRANSLATED

To reach a wider audience of non-English speakers, consider translation. If a document is going to be translated into various languages, make sure to select a robust typeface with sufficient glyphs. (Glyphs refer to individual characters of a typeface including accented letters, ligatures, and punctuation marks. Different languages may require accented letters or additional punctuation marks that aren't used in English).

Russian is the third-most commonly spoken language in Oregon after English and Spanish.<sup>19</sup> If you plan on translating to Russian, use a font with both Latin and Cyrillic characters.

For translating into non-Latin based alphabets (such as Arabic or Chinese) sourcing an additional typeface will be necessary.

### LARGE PRINT

Intended for people with low vision, large print refers to documents with body copy at 18pt or larger.<sup>20</sup> By comparison, the text in this paragraph is 12pt.

Because large print can take up a lot of space, it may become impractical for longer documents. The large number of pages can drive up printing costs.<sup>21</sup> If printing costs are a concern, consider creating an audio version instead of a large print document.

## AUDIO VERSION

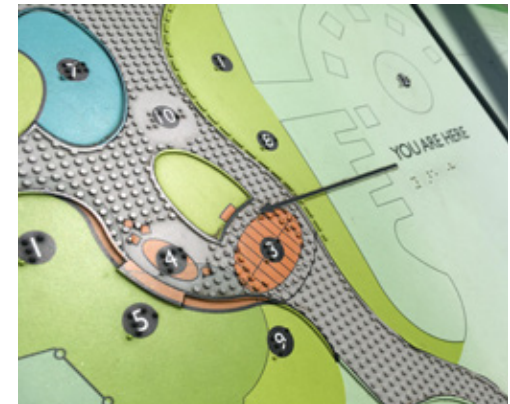
An audio version may be another alternate format worth considering. This is helpful not only for people with visual impairments, but also for people with reading disabilities (including illiteracy, low literacy, or dyslexia). Audio versions can be translated into a variety of different languages and can be a cost-efficient alternative to printing Braille or large print documents. For maximum accessibility, use high-quality audio recordings.<sup>22</sup> (For example, record the audio in a quiet space without background noise and make sure the translator is speaking slowly and clearly).

## BRAILLE

Braille is a raised letter format intended for people with low vision and those who are legally blind. Braille can be expensive to print, and is best used for permanent graphics (like signage and wayfinding).

## TACTILE FORMAT

For permanent graphics like large maps, a tactile format may be appropriate to consider. Tactile maps use raised surfaces and textures to describe information for people with visual impairments.



Example of a tactile map from the Seattle Sensory Garden in Seattle, Washington.

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03

# **Print Materials: Best Practices**

# Hierarchy

## ORGANIZATION

When content is not structured logically and visuals compete for attention, the reader is left feeling confused. The most important information should be largest, and supplemental information should be smaller.

## USE OF HEADERS

Headers and subheaders are your friend! They help effectively establish levels of hierarchy throughout a document. Readers can quickly skim headers to understand the overall content and purpose of a document, then reading details that they find most relevant or interesting.<sup>23</sup>

# H1: Main Header

## H2: Section Header

### H3: SUBTOPIC HEADER

Body: Supporting copy

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This document uses four levels to organize content. H1, H2, H3 and Body. Some documents may require more or less levels depending on content.

# Typography

## STYLE

In a nutshell, font choice can greatly affect the legibility of a document.

**Serif fonts** have small extensions or serifs attached to the end of their strokes. Certain serif fonts can be difficult to read because they use both thick and thin strokes.

Some accessible serif fonts include: Times New Roman, Book Antiqua, Georgia, and Palatino.

**Sans serif fonts** do not have serifs at the end of their strokes. Sans serif fonts tend to be the easiest to read and are a good option for body copy.

Some accessible sans serif fonts include: Helvetica, Arial, Verdana,

Gotham, Gill Sans, and Univers.<sup>24</sup>

**Script fonts** are based on the fluid strokes of cursive handwriting. Because script fonts can be hard to read, use them sparingly.

**Display fonts** are intended for use at larger sizes or headings as opposed to large bodies of text. Use display fonts sparingly or not at all.

**Monotype fonts** were created for typewriters. Their spaces are less natural since each letterform is the exact same width. In general, monotype fonts like Courier should be avoided (unless you're using a manual typewriter or coding web pages!).

**I'm a serif font. Some of us are more legible than others. I can be a good option if my thick and thin strokes aren't too extreme.**

**I'm a sans serif font. I'm a great workhorse font. Use me as often as you like!**

*I'm a script! Use me sparingly.*

**I'M A DISPLAY FONT.  
USE ME SPARINGLY TOO!**

**I'm a monotype font and I was created for a typewriter. I wasn't designed with accessibility in mind. Avoid using me.**

Let's take a look at x-height, which is measured by the height of the lowercase 'x'. This font is 13pt Futura.

Now compare this font, which is 13pt Gotham. It appears much bigger because it has a tall x-height!

This is 13pt Le Havre. It looks tiny by comparison! It has a very small x-height.

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Even though each of these fonts are the same point size, they have very different x-heights. Fonts with larger x-heights appear much larger than those with small x-heights.

## SCALE

The size of a typeface can be determined by a variety of factors. One such measurement is x-height. The x-height of letters refers to the height of the lowercase 'x'. The larger the x-height, the easier the typeface is to read.

Another factor to consider is the width-to-height ratio of letters. Letters that are condensed/narrow or wide/extended tend to be much harder to read than letters which have more equal proportions. Try to avoid using these versions of the typefaces.

## SHAPE / WEIGHT

Regular, Book, and Medium weights of fonts are the most balanced and tend to be the easiest to read.

By contrast, Ultra Light or Ultra Black fonts tend to be difficult to read. Not only do these font styles change the weight of the letters, but they also change the shape of the negative space within the letters causing legibility issues.

Use italics, underlining, bold, and CAPS sparingly. While these treatments can help emphasize a word or phrase, if entire blocks of text are set in these treatments, they can become harder to read and impact overall tone.<sup>25</sup>

## SPACING

**Kerning** refers to the horizontal space between individual letterforms. When words are poorly kerned they can be hard to read; letters may begin to touch or large gaps can appear.

**Tracking** refers to uniform horizontal spacing within a line of text. If too loose or too tight, tracking can affect legibility. For body copy, aim to keep tracking at 0, although anywhere from -10 to 10 could be acceptable depending on the font.

**Leading** refers to vertical spacing between lines of text. Leading gets its name from letterpress typesetting when actual strips of lead were used to separate lines of type.

Default leading in most applications is 120% (e.g. 12pt font has 14.4pt leading). However, sometimes 120% may feel too tight. Consider expanding the leading up to 150% for extra breathability (e.g. 12pt font would have 18pt leading). Up to 200% leading may be acceptable in some cases,

### This is an example of poor kerning.

This type is tracked at 0 with a leading of 150%. It feels balanced and well spaced.

This type is tracked at -100 with a leading of 100%. The letters are starting to touch, making it difficult to read. It feels crowded!

This type is tracked at 100 with a leading of 250%. It feels disconnected. There is too much space.

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Spacing can have a huge impact on legibility. Double check kerning, tracking and leading for maximum accessibility.

but anything beyond that will feel too loose and disconnected.<sup>26</sup>

Use plenty of **white space** to improve accessibility. White space is negative space on a page that does not have images, text or other graphics. Effective use of white space can greatly improve legibility for people with low vision or vision impairments. One way to improve add white space is to increase the size of the margins.<sup>27</sup>

## DIMENSION

**Point size:** For body copy, point size should be no smaller than 12pt. Large print formats should use a minimum of 18pt and may use fonts up to 24pt or even larger.

## ALIGNMENT

**Left-aligned** text is the easiest to read because Western languages read left to right. When text is flush left, readers can more easily find their starting point. The right edge of the type should be ragged (or uneven).

**Right aligned or centered** text can be difficult for readers to find their starting point. Use sparingly for small bits of information.

**Justified** type means that text is both flush left and flush right. However, justified text creates “rivers” of blank space which hinders legibility. Use of justified text is not recommended.<sup>28</sup>

Let's explore paragraph alignment! Left-aligned text with a ragged or uneven right edge is the easiest to read. The left edge gives readers a consistent starting point to orient themselves.

Justified text is both left-aligned and right-aligned. However, justified text often creates “rivers” or huge gaps between words. This can negatively impact legibility. Avoid justified text whenever possible.

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Left-aligned type (above) is significantly more legible than the justified text below it. Use left-aligned text whenever possible.



## LINE LENGTH

Line length or column width can also affect accessibility. If a column is too wide, the reader has a difficult time finding the next line of type. If a line length is too short, text becomes choppy and hyphenated. Generally speaking, lines should be no longer than 60 characters wide.

## HYPHENATION

Hyphenation should be avoided. It chops up words and hinders the reader's flow. People with reading disabilities find hyphenation to be particularly disruptive.

In terms of accessible documents, this column width is exceptionally wide. There are 81 characters in the first line of text. Long line lengths can be difficult for readers with low vision or reading disabilities. For maximum accessibility, use lines of type that are less than 60 characters wide.

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Consider line lengths or column width when designing accessible documents. If line lengths are too long (above) or too short (right) readability can be hindered. Avoid hyphenating words.

## LINE STYLE

Lines of type should always be straight and horizontal. Text should never be curvy, wavy, in a circle or other shape. Vertical and horizontal text should be avoided.<sup>29</sup>

By comparison, this line length feels very short. It chops up the overall flow. Short line lengths hyphenate longer words. Hyphenation should be avoided whenever possible!

# Color



Above is a standard color wheel. When choosing a color palette, try to pick complimentary colors (or colors that are opposite one another on the wheel).<sup>30</sup>

## CONTRAST

When designing with your materials, choose colors that have sufficient contrast.

When choosing a color palette, pick complimentary colors which appear at opposite ends of the color wheel.

Aim for 70% contrast between colors. A good way to test for contrast is to print a document in black and white. If the difference between colors is hard to see, increase the contrast between colors.<sup>31</sup>

## PLANNING FOR COLOR DEFICIENCIES

Avoid color-coding a document. For example, instead of saying “everything in green text is positive and everything in red text is negative” say something like, “everything with a ‘v’ is positive and everything with an ‘x’ is negative”. This makes the document accessible to anyone with a color deficiency.<sup>32</sup>

Additionally, using patterns (such as dashed or dotted lines) can help differentiate two color-coded items.

# Graphics & Images

## PHOTOGRAPHY

Photographs should be high contrast; people with low vision can have a hard time deciphering low contrast images. Avoid placing photographs and images behind text, as it can be more difficult to read.

## ILLUSTRATIONS

Illustrations should also be high contrast. Simple illustrations with thick dark linework and shapes are the easiest to interpret. Avoid overly intricate illustrations with fine lines and lots of colors.<sup>32</sup>

## ICONOGRAPHY

Icons should have high contrast linework or shapes. When possible use well-known icons for ease of recognition.<sup>33</sup>

Download Disability Access Symbols for free: [graphicartistsguild.org/downloadable-disability-access-symbols/](http://graphicartistsguild.org/downloadable-disability-access-symbols/)

Download Google icons for free: [material.io/tools/icons/](http://material.io/tools/icons/)

Download AIGA Symbols Signs for free: [aiga.org/symbol-signs](http://aiga.org/symbol-signs)



*Disability Access Symbols*



*Google icons*



*AIGA Symbol Signs*

A selection of various commonly used symbols. Disability Access Symbols (top) can be used to identify accessible documents or accessible physical locations. For example, the Braille symbol may be placed on the cover of a document that has Braille in the inside. Google also has a robust system of icons. The sound icon, for example, could be placed near an audio recording. AIGA Symbol Signs (bottom) are often used in signage to indicate items like restrooms, stairs, etc.

# Printing



People may use visual aides to help them read documents. Selecting paper that works well with these devices will improve overall readability.

## PAPER COLOR & WEIGHT

Often overlooked, print choices can negatively affect an otherwise accessible document.

When selecting a paper color, keep in mind that a warm off-white color is best. Bright white paper can create a glare, making a document difficult to read.

If printing a double-sided document, consider a heavier paper weight (at least 24lb). Thin paper will create shadows and show text from the opposite side of the document.<sup>34</sup>

## TEXTURE

Paper stock should be smooth, free of any texture, watermarks or noticeable paper grain. Avoid using handmade and natural papers.

## FINISHES

**Matte or uncoated** paper is the easiest to read since it reduces glare. Dull coated stock is also acceptable.

**Glossy** paper can create a glare, making documents difficult to read. Avoid glossy paper whenever possible.<sup>35</sup>



# Summary

Accessible documents support goals of reaching the maximum number of people, and eliminating barriers to use. By creating printed materials that adhere to these practical accessibility guidelines, we are more effectively communicating to our target audiences; ensuring that our important messages are being heard.

*Thank you!*

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# Resources

1. Color Contrast Checker: <https://webaim.org/resources/contrastchecker/>
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