



Amazon Kindle Publishing Guidelines

How to make books available for the Kindle
platform

version 2017.4

This document describes the primary ways publishers, authors, and conversion houses can make their content available on the Amazon Kindle platform. This document includes guidelines and suggestions to ensure a smooth conversion and publication process.

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Revision History

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Part I. Getting Started

1 Introduction

There are several options for making your books available for the Amazon Kindle platform. Which option is best for you depends upon the nature of your publications (such as your source file format), your available resources and technical expertise, and your eBook sales model. To help you choose, here are examples of common publishing scenarios and recommendations:

- For self-publishers or authors who would like to take advantage of Amazon's self-service tools to create Kindle books and sell them on Amazon, see section 2.1, Amazon's Kindle Direct Publishing Platform.
- For publishers with many titles to convert and the expertise to create Kindle books in-house using Kindle Publisher Tools software, see section 2.2, Creating Kindle Books In-House Using Kindle Publisher Tools.
- For publishers who do not wish to convert titles in-house or do not have the technical expertise to do so, outsourcing to a conversion house is described in section 2.3, Third-Party Conversion Services.

2 Paths to Getting Your Content on Kindle

2.1 Amazon's Kindle Direct Publishing Platform

Self-publishers can convert books into electronic format using Amazon's self-publishing tools and sell them on Amazon Kindle with Amazon's Kindle Direct Publishing Platform (KDP). KDP is a fast, easy self-publishing system for Amazon Kindle. Upload your content, enter sales copy and pricing information, and publish in minutes. To learn more or sign up, visit <http://kdp.amazon.com>.

2.2 Creating Kindle Books In-House Using Kindle Publisher Tools

Publishers can create Kindle books in-house from HTML, XHTML, and EPUB files by using the Kindle Publisher tools. Amazon officially supports these tools to convert files to Kindle supported formats. Kindle files created with these tools are designed to be compatible with current and future Kindle devices and applications. Files created with third-party software may not work properly on current or future Kindle devices and applications.

2.2.1 KindleGen

Publishers can create Kindle files in-house by using a free software program called KindleGen. This is a command line tool to be used for local preview and QA checks while creating Kindle books. KindleGen accepts source content in HTML, XHTML, or EPUB format.

The most recent version of KindleGen can be downloaded for free from www.amazon.com/kindleformat/kindlegen. The instructions for installing KindleGen can be found in the KindleGen ReadMe file in the downloaded file folder.

To create Kindle files using KindleGen, you need:

- A single HTML file that represents the entire book; or
- EPUB-compliant files. (IDPF's EPUB spec is available at <http://idpf.org/EPUB/30/spec/EPUB30-overview.html>)

Using the EPUB spec, you can create a Kindle book with multiple HTML files and a single OPF file that links all of them together.

As conversion progresses, KindleGen displays detailed informational messages. If KindleGen encounters issues while converting a file, it displays a warning or error.

Amazon strongly recommends fixing all KindleGen warnings and errors before publishing a Kindle book.

- If KindleGen displays an error, it will not create the .mobi file. Errors impair the readability of the book in the Kindle software.
- If KindleGen displays a warning, it will create the .mobi file with an attempt to automatically fix the issue described in the warning. Amazon does not guarantee the results of any KindleGen automatic fix, which could lead to the Kindle book displaying differently than designed.

2.2.2 Kindle Previewer Software

Kindle Previewer is a graphical user interface application that imitates how books display on Kindle devices and applications. Kindle Previewer makes it easy to preview the layout of a book and make sure its content displays properly for any orientation or font size. Kindle Previewer is available for the Windows and Mac OS X platforms. The most recent version of Kindle Previewer can be downloaded for free from www.amazon.com/kindleformat/kindlepreviewer. Installation and help documentation can be found at http://kindlepreviewer3.s3.amazonaws.com/UserGuide_EN.pdf.

Amazon recommends using Kindle Previewer 3 for regular updates that provide access to the latest Kindle conversion, typographic, and layout improvements that come with Enhanced Typesetting. For any questions or feedback, please contact us at kindle-publishing-tools@amazon.com.

2.2.3 Kindle Textbook Creator

Kindle Textbook Creator is a free tool designed to help authors and educators create, preview, and publish Kindle textbooks and supplemental educational materials without having to know any HTML or CSS. In a few steps, you can import your PDF content into Kindle Textbook Creator and then add supplemental audio, video, and image pop-ups that enhance the student learning experience. You can use the built-in previewer to see how your book appears on a range of Kindle devices and free Kindle reading applications.

Once your book is ready, you can export your book and upload it to Kindle Direct Publishing (KDP) to make it available to customers.

Kindle Textbook Creator is available for the Windows and Mac OS X platforms. The most recent version can be downloaded for free from www.amazon.com/ktc.

2.2.4 Kindle Comic Creator

Kindle Comic Creator is a free tool for authors and publishers to turn graphic novels, comics, and manga into Kindle books. Kindle Comic Creator makes it easy to import original artwork, optimize the experience of readers, and preview how a book will look on Kindle devices.

Kindle Comic Creator accepts single or multi-page source files in .pdf, .jpg/.jpeg, .tif/.tiff, .ppm, or .png formats, so authors are free to create artwork using their preferred design tools. More detailed guidance for graphic novels/manga/comics can be found in section 11.

Kindle Comic Creator is available for the Windows and Mac OS X platforms. The most recent version can be downloaded for free from www.amazon.com/kc2.

2.2.5 Kindle Kids' Book Creator

Kindle Kids' Book Creator is a free tool that authors and publishers can use to turn illustrated kids' books into Kindle books. This tool makes it easy to import original artwork, optimize the experience of readers, and preview how a book will look on Kindle devices and applications.

Kindle Kids' Book Creator accepts source files in .jpg/.jpeg, .tif/.tiff, .png, and .ppm formats, so authors are free to create artwork using their preferred design tools. More detailed guidance for children's books can be found in section 10.

Kindle Kids' Book is available for the Windows and Mac OS X platforms. The most recent version can be downloaded for free from www.amazon.com/kidsbookcreator.

2.3 Third-Party Conversion Services

Publishers have the option to outsource conversion of titles from a variety of file formats to eBook formats. Conversion houses offer publishers solutions and services that include taking a variety of input formats and creating eBook or print-ready output. The typical input formats are:

- Word (.DOC, .DOCX), Rich Text Format (.rtf), Text (.txt)
- PDF
- Scan of print book
- FrameMaker, InDesign, PageMaker, QuarkXPress
- XML (such as DocBook, etc.)
- HTML, XHTML
- EPUB (also known as IDPF or OEB)

As you explore conversion house options, Amazon recommends that you confirm which source format(s) the conversion house requires to convert files for use on Kindle.

The preferred outputs from conversion houses to be processed by Amazon are:

- Books in EPUB/Mobi format (.epub/.mobi)
- Metadata in ONIX format (XML)

KindleGen compiles the EPUB file and runs checks for common errors. Any errors or warnings will prevent the titles from becoming available. These errors must be fixed in the EPUB file before the title is published in the Kindle store. Titles in EPUB format must be tested on Amazon software and/or hardware and must abide by the publishing guidelines in this document.

Conversion houses can be of service in helping publishers supply eBook retailers with metadata.

3 Comparing Formats

To determine how to convert a print book for the best Kindle experience, key elements in the source are identified and evaluated against the different conversion formats. Some formats are specifically designed for certain types of books (e.g., panel view for comics), but more complex books must be analyzed to determine the best fit for the title. Only one format can be used for each Kindle book.

This chart compares our most common Kindle book formats.

Conversion Format	Best Suited To	Key Features	Supported Devices	Limitations	Guidelines
Reflowable	Text-heavy titles	Adjustable orientation Adjustable font settings Dictionary look-up Highlighting Word search X-Ray	All Kindle devices and applications	Some complex layouts may be difficult or impossible to replicate	Section 9: Creating Text-Heavy Fiction and Non-Fiction eBooks (Reflowable)
Fixed-Layout with Text Pop-Ups	Image-heavy books with a low volume of text, such as children's picture books or coffee table books	Fixed layout Text pop-ups	Fire tablets Kindle for Android Kindle for iOS Kindle Cloud Reader Kindle E-reader (on a case by case basis)	No text selection, dictionary, or user font settings	Section 10: Creating Fixed-Layout Books with Text Pop-Ups
Fixed-Layout with Image Pop-Ups (Panel View)	Comics or graphic novels of low complexity with uniform rectangular panels	Fixed layout Image pop-ups	Kindle E-reader (3 rd generation and later) Fire tablets Kindle for Android Kindle for iOS Kindle Cloud Reader	No text selection, dictionary, or user font settings	Section 11: Creating Fixed-Layout Books with Image Pop-Ups or Virtual Panels

Conversion Format	Best Suited To	Key Features	Supported Devices	Limitations	Guidelines
Fixed-Layout with Virtual Panels (Manga)	Highly complex comics that use irregularly-sized panels or art that extends past the borders of pop-ups, such as manga	Adjustable orientation Virtual panels Synthetic spreads (in landscape) Pinch-to-zoom	Fire tablets (2 nd generation and later) Kindle E-reader (touch screen models only) Kindle for Android Kindle for iOS Kindle Cloud Reader	No text selection, dictionary, or user font settings	Section 11: Creating Fixed-Layout Books with Image Pop-Ups or Virtual Panels
Fixed-Layout without Pop-Ups	Image-heavy books with large text	Fixed layout Dictionary look-up Highlighting Word search X-Ray	Kindle E-reader (text selectability features are not supported) Fire tablets Kindle for Android Kindle for iOS Kindle Cloud Reader (text selectability features are not supported)	Only for use on books with type large enough to be read on all devices without magnification No user font settings	Section 12: Creating Fixed-Layout Books Without Pop-Ups
Kindle Edition with Audio/Video	Text-heavy titles with audio and/or video content	Adjustable orientation Adjustable text settings Dictionary look-up Highlighting Word search X-Ray Inline audio and video	Fire tablets (2 nd generation and later) Kindle for iOS	KF8 features are not currently supported in Kindle Edition with Audio/Video content (see sections 13.5 and 13.6)	Section 13: Creating Kindle Edition with Audio/Video Content

Part II. General Best Practices

4 Cover Image Guidelines

4.1 Marketing Cover Image Is Mandatory

Kindle books must have a marketing cover image provided for use on the website detail page. This is provided separately from the eBook file. The preferred format for the marketing cover is an image of at least 2700 pixels on the longest side and at least 1688 pixels on the shortest side with 300 ppi to ensure image clarity on Kindle HDX devices. The image file size should be 5MB or smaller.

If the marketing cover image size is smaller than the 2700 x 1688 recommendation, a reminder message is displayed at time of upload. Covers with less than 500 pixels on the shortest side are not displayed on the website.

If your cover image is smaller than the recommended size, Amazon strongly recommends that you create a new image that meets the size requirements. Do not stretch the image to meet the size requirements, because this may lower the image quality.

The content of the cover image must not:

- Infringe another publisher's or artist's copyright on the same cover.
- Mention pricing or other temporary promotional offers.

Important: Use RGB as the color profile when saving your cover image files. Kindle does not support CMYK.

4.2 Internal Content Cover Image Is Mandatory

Kindle books must have an internal cover image provided for use within the book content. Provide a large, high-resolution cover, because Amazon quality assurance will fail the book if the cover is too small.

Do not add an HTML cover page to the content in addition to the cover image. This may result in the cover appearing twice in the book or cause the book to fail conversion.

Define covers in the OPF file using either of the following methods (underlined elements are mandatory):

Method 1 (preferred):

```
<manifest>
...
<item id="cimage" media-type="image/jpeg" href="other_cover.jpg" properties="cover-image"/>
...
</manifest>
```

This syntax is part of IDPF 3.0 standard and described at <http://idpf.org/epub/30/spec/epub30-publications-20111011.html#sec-item-property-values>.

Method 2:

```

<metadata>
...
<meta name="cover" content="my-cover-image" />
...
</metadata>
...
<manifest>
...
<item href="MyCoverImage.jpg" id="my-cover-image" media-type="image/jpeg" />
...
</manifest>
```

This syntax is not part of the IDPF standard. However, it was designed with help from the IDPF and will validate in an IDPF validator.

5 Navigation Guidelines

Amazon strongly recommends the use of an HTML table of contents (TOC) for all books that would benefit from this navigation feature. This applies to most books, but is optional for most fixed-layout children's books (see section 10) and fixed-layout graphic novels/manga/comics (see section 11).

Amazon requires that all Kindle books include a logical TOC. The logical TOC is very important for a good reading experience, because it allows a reader to navigate between chapters easily. Users expect to see an HTML TOC when paging through a book from the beginning, while the logical TOC is an additional way for users to navigate books. The inclusion of a logical TOC is especially important for books that are longer than 20 pages.

For additional guidelines on audio/video navigation see section 13.4.

5.1 HTML TOC Guidelines

Place the HTML TOC towards the beginning of the book and not at the end of the book. This ensures that a customer paging through the book from the beginning encounters the TOC naturally. Incorrect placement of the TOC affects the accuracy of the "Last Page Read" feature. Correct placement ensures that the TOC appears in sample downloads of the book.

HTML TOC Best Practices:

- The entries in the TOC must be HTML links so that users can click to go to a specific location. A table of contents that is not made of links is not useful on Kindle.
- Do not create a TOC using HTML <table> tags. Tables are for tabular data only, not for layout.
- Do not use page numbers in the TOC. Kindle books do not always map directly to page numbers in physical editions of the book.

- If you are importing the document from Word, use the “Heading” styles and the “Table of Contents” feature of Microsoft Word. The TOC created by Word will be imported correctly and will convert to a TOC that follows these guidelines.
- For bundled editions containing more than one individual book, include an overarching TOC at the beginning of the file.

5.1.1 Using a Nested HTML TOC

To create useful and navigable nested TOC entries, Amazon recommends using the following syntax in the HTML TOC. The examples below show two ways of writing the same sample code: style attributes and CSS classes.

Using style attributes:

```
<div>Section 1</div>
<div style="margin-left:2%;">Chapter 1</div>
<div style="margin-left:2%;">Chapter 2</div>
<div style="margin-left:2%;">Chapter 3</div>
<div style="margin-left:4%;">Subchapter 1</div>
<div style="margin-left:4%;">Subchapter 2</div>
<div style="margin-left:2%;">Chapter 4</div>
<div style="margin-left:4%;">Subchapter 1</div>
<div>Section 2</div>
...
```

Using CSS classes:

```
<style>
div.chapter { margin-left: 1em}
div.subchapter { margin-left: 2em}
</style>

<div>Section 1</div>
<div class="chapter">Chapter 1</div>
<div class="chapter">Chapter 2</div>
<div class="chapter">Chapter 3</div>
<div class="subchapter">Subchapter 1</div>
<div class="subchapter">Subchapter 2</div>
<div class="chapter">Chapter 4</div>
<div class="subchapter">Subchapter 1</div>
<div>Section 2</div>
...
```

5.2 NCX Guidelines

Logical TOCs are generated using `toc` `nav` elements or a navigational control file for XML application (NCX). Creating a logical TOC exposes the hierarchical structure of a Kindle book and allows the user to navigate through it using the Kindle menu. The inclusion of a logical TOC is especially important for books that are longer than 20 pages.

In logical TOC-enabled books, users can see where they are in the book because the part, chapter, or section is exposed. This progress indicator also shows relative progress through the book.

For guidance on creating a logical TOC using a `toc nav` element, see section 5.2.1.

For guidance on creating a logical TOC using NCX, see section 5.2.2.

5.2.1 Creating a Logical TOC Using a `toc nav` Element

The `toc nav` element is part of the IDPF 3.0 specification and is described at

<http://idpf.org/epub/30/spec/epub30-contentdocs-20111011.html#sec-xhtml-nav-def-model> and

<http://idpf.org/epub/30/spec/epub30-contentdocs-20111011.html#sec-xhtml-nav-def-types-toc>.

Creating a `toc nav` element provides both a logical TOC and an HTML TOC. The `toc nav` element should be a separate HTML document from the HTML TOC.

Example:

```
<nav epub:type="toc">

<ol>

<li><a href="Sway_body.html#preface_1">AUTHOR'S NOTE</a></li>

<li><a href="Sway_body.html#part_1">PART ONE</a>

    <ol>

        <li><a href="Sway_body.html#chapter_1">THE HOUSES, 1969</a></li>

        <li><a href="Sway_body.html#chapter_2">ROCK AND ROLL, 1962</a></li>

        <li><a href="Sway_body.html#chapter_3">THE EMPRESS, 1928–1947</a></li>

    </ol>

</li>

</ol>

</nav>
```

The example above defines the following TOC hierarchy:

AUTHOR'S NOTE
PART ONE
 THE HOUSES, 1969
 ROCK AND ROLL, 1962
 THE EMPRESS, 1928–1947

This excerpt from the OPF (publication header file) shows how to declare the `toc nav` element in the `<manifest>`:

Example:

```
<manifest>

<item id="toc" properties="nav" href="xhtml/toc.xhtml" media-
type="application/xhtml+xml"/>
```

Using it in the `<spine>` is optional if it will be used as the HTML TOC.

Example:

```
<spine>  
  
<itemref idref="toc"/>
```

5.2.2 Creating a Logical TOC Using NCX

NCX is part of the IDPF 2.0 specification and is described at <http://www.niso.org/workrooms/daisy/Z39-86-2005.html#NCX>.

NCX Example:

```
<navMap>  
  
<navPoint class="titlepage" id="L1T" playOrder="1">  
  
  <navLabel><text>AUTHOR'S NOTE</text></navLabel>  
  
  <content src="Sway_body.html#preface_1" />  
  
</navPoint>  
  
<navPoint class="book" id="level1-book1" playOrder="2">  
  
  <navLabel><text>PART ONE</text></navLabel>  
  
  <content src="Sway_body.html#part_1" />  
  
  <navPoint class="chapter" id="level2-book1chap01" playOrder="3">  
  
    <navLabel><text>THE HOUSES, 1969</text></navLabel>  
  
    <content src="Sway_body.html#chapter_1" />  
  
</navPoint>  
  
<navPoint class="chapter" id="level2-book1chap02" playOrder="4">  
  
  <navLabel><text>ROCK AND ROLL, 1962</text></navLabel>  
  
  <content src="Sway_body.html#chapter_2" />  
  
</navPoint>  
  
<navPoint class="chapter" id="level2-book1chap03" playOrder="5">  
  
  <navLabel><text>THE EMPRESS, 1928–1947</text></navLabel>  
  
  <content src="Sway_body.html#chapter_3" />  
  
</navPoint>  
  
</navMap>
```

The NCX example above defines the following TOC hierarchy:

AUTHOR'S NOTE
PART ONE
THE HOUSES, 1969
ROCK AND ROLL, 1962
THE EMPRESS, 1928–1947

Amazon requires that the NCX elements follow the same order as the book. (For example, the link for Chapter 2 should not precede the link for Chapter 1.) This excerpt from the OPF (publication header file) shows how to add an NCX table of contents to a book.

Declare the NCX in the <manifest>:

```
<manifest>  
  
<item id="toc" media-type="application/x-dtbncx+xml"  
      href="toc.ncx"/>
```

And reference it in the <spine>:

```
<spine toc="toc">
```

5.3 Guide Items

Guide items are an optional feature in the EPUB format but are highly recommended. Kindle provides support for the cover, TOC, and start reading location ("Go to Beginning") guide items. If you choose not to include guide items for the cover and TOC, these list items will still appear in the Kindle menus, but will be grayed out and not selectable. Publishers do not need to define a start reading location because Amazon does this during the upload process.

5.3.1 Defining Cover and TOC

The Kindle platform supports both `landmarks nav` elements and guide items for defining the cover and table of contents (TOC). These elements serve to supplement the TOC and should not be used in place of one.

The `landmarks nav` elements are part of the IDPF 3.0 specification and are described at:

<http://idpf.org/epub/30/spec/epub30-contentdocs-20111011.html#sec-xhtml-nav-def-model> and
<http://idpf.org/epub/30/spec/epub30-contentdocs-20111011.html#sec-xhtml-nav-def-types-landmarks>.

Here is an example of a guide item for a TOC (underlined elements are mandatory):

```
<guide> <reference type="toc" title="Table of Contents" href="toc.html"/> </guide>
```

Here is an example of a `landmarks nav` element for a TOC (underlined elements are mandatory):

```
<nav epub:type="landmarks">  
  
<ol><li><a type="toc" href="toc.html">Table of Contents</a></li></ol>  
  
</nav>
```

6 HTML and CSS Guidelines

For a list of supported HTML elements see section 16.1. For a list of supported CSS elements see section 16.2.

6.1 Constructing Well-Formed HTML Documents (XHTML)

Kindle Format 8 supports most HTML 5.0 features, although the following HTML features are not fully supported: forms, frames, and JavaScript.

When creating source HTML or XHTML for the Kindle, refer to one of the following resources as a primer on constructing well-formed HTML documents:

- International Digital Publishing Forum (IDPF) EPUB Standards: <http://idpf.org/epub>
- World Wide Web Consortium (W3C) Standards: <https://www.w3.org/standards/>
- World Wide Web Consortium (W3C) HTML and CSS Guidelines: <https://www.w3.org/standards/webdesign/htmlcss>

6.2 Avoid Using Negative Values

Avoid using negative values for positioning text and margins. Positioning with negative values without adding padding for compensation can cause content to display with the edge cut off. For example, if you want to use text-indent: -2em you also need to apply padding-left: 2em.

Do not use negative values for the line-height attribute. They are not supported.

6.3 Avoid Using Scripting

Scripting is not supported. All scripts are stripped from the source during conversion.

6.4 Avoid Nested <p> Tags

In compliance with W3C standards, avoid nested <p> tags. Files with nested <p> tags do not convert properly.

6.5 File References Must Match Case and Spelling of Source

Per W3C HTML standards, all file references (fonts, images, etc.) must match the case and spelling of the name of the source file exactly. (**Example:** “audiovideo/ThisFile.mp4” is different from “audiovideo/Thisfile.mp4”.)

To indicate a file in a directory, use “/” characters and not “\” characters. (**Example:** “multimedia/ThisFile.mp4” is valid, but “multimedia\ThisFile.mp4” is not.)

6.6 Other Encodings Are Supported

The source of a Kindle book can be encoded in many different ways. All encodings are supported, provided that:

- The encoding of the HTML files is clearly stated in the HTML.
- The computer used for compiling the sources supports the encoding and knows how to convert it to Unicode.

Amazon recommends specifying the encoding of the HTML by using the <meta> tag in the <head> section or an XML declaration.

Method 1:

```
<html>  
  
<head>  
  
...  
  
<meta http-equiv="content-type" content="text/html; charset=UTF-8">  
  
...
```

Method 2:

```
<?xml version="1.0" encoding="UTF-8"?>
```

6.7 Use Supported Characters and Spaces

Characters should be represented using plain text UTF-8 characters, except where XML entities are strictly required or are easier for humans to read than their character equivalents. For example, instead of using the "©" entity, use the © character.

XML entities are strictly required for "<" (<), ">" (>), and "&" (&).

The only supported spaces are the normal space, the non-breaking space (), and the zero-width non-joiner (‌). Use of any other space can break the selection, dictionary lookup, and line-wrap algorithms.

Do NOT use Unicode format characters, as they may cause problems.

6.8 Design for a Good eBook Experience

Kindle supports float via CSS, but this does not guarantee that the floating of text and images will produce an exact replica of the print layout on all Kindle devices and applications. If float is not producing the desired result, Amazon recommends rethinking the design and layout to create the best possible eBook experience rather than fixating on duplicating the print experience on a device. Using fixed-layout format just to replicate print layout is not allowed in Kindle books because customers report this as a bad user experience.

7 Hyperlink Guidelines

7.1 Internal Link Guidelines

Internal links can be used to link separate content within the book. Some examples of this include:

- Links from the book-level table of contents to each individual chapter (see sections 5.1 and 5.1.1)
- Links from a chapter-level table of contents to subchapters or chapter sections
- Links to an appendix or glossary
- Footnotes (see section 9.3.11)

Amazon requires formatting footnotes with bi-directional hyperlinks (the text is linked to the footnote and the footnote is linked back to the text). This makes it easier for customers to return to the text after viewing the footnote. On some devices, the footnote is displayed in a pop-up window.

To avoid unintended footnote pop-ups, internal links that are not footnotes should not be formatted with bi-directional hyperlinks (A links to B and B links to A). Non-footnote links should use the format A links to B and B links to C instead. For example, links from a chapter-level table of contents to a chapter section should link back to the chapter heading.

Internal hyperlinks are not currently supported on E-reader devices in fixed-layout books.

7.2 External Link Guidelines

External links within Kindle books should be present only if they directly enhance the reader experience and the content of the title as determined by Amazon. Some examples of this include:

- Links to previous or subsequent books in a series
- Links to multimedia content directly related the content of title
- Links to additional ancillary material (e.g., checklists, assessment forms, craft patterns, and similar printable materials)
- Links to topical websites (e.g., link to Whitehouse.gov in a Kindle book about the American government)
- Social media related to the book or author (e.g., Twitter hashtag)

Some examples of prohibited links include:

- Links to pornography
- Links to commercial eBook store sites other than Amazon
- Links to web forms that request customer information (e.g., email address, physical address or similar)
- Links to illegal, harmful, infringing, or offensive content
- Links that are malicious in intent (e.g., virus, phishing, or similar)

External hyperlinks are not currently supported on E-reader devices in fixed-layout books. Amazon reserves the right to remove links in its sole discretion.

8 QA Standards

Amazon strongly recommends that you verify your exported content before converting it into a Kindle book because some content creation tools format content differently when exporting to HTML.

In addition, Amazon encourages you to review the entire book for:

- Missing content
- Wrong content
- Typos and complete character support
- Alignment errors
- Forced typeface throughout the entire book (reflowable only) or correct font (fixed-layout)
- Image quality
- Proper paragraph spacing and indenting
- Forced font color or background color (reflowable only)

These errors negatively affect readability and may require the Amazon team to suppress the title to protect the reader's experience.

8.1 Testing Kindle Books

There are three ways to test your Kindle book before adding it to the Kindle store:

1. **Use Kindle Previewer.** You can test your EPUB file using the Kindle Previewer software, available for both Windows and Mac OS X. Kindle Previewer is a great way to test your Kindle books for the latest typographic and layout improvements that come with Enhanced Typesetting. Kindle Previewer allows you to select views that represent different Kindle devices and applications. The most recent version of Kindle Previewer can be downloaded for free from www.amazon.com/kindleformat/kindlepreviewer.
2. **Use KDP.** The Kindle Direct Publishing Platform accepts a variety of book formats and provides preview capability on the website. To learn more or sign up, visit <http://kdp.amazon.com>.
3. **Use Kindle devices and applications.** You can test Kindle content with a Kindle E-reader, a Fire tablet, or the Kindle application on other devices. To sideload an eBook onto a device, you must have a .mobi file (Kindle and Android devices) or an .azk file (iOS devices). If your book supports Enhanced Typesetting, sideloading does not provide an accurate preview of those layout and typographic improvements. You can use Kindle Previewer to confirm that your book supports Enhanced Typesetting.

Converting to a .mobi or .azk file:

- a. Open Kindle Previewer 3 and load the title by selecting **File > Open Book**. The book may take several seconds to load.
- b. To convert a .mobi file or an .azk file, select **File > Export**.
 - To create a file for testing on Kindle or Android devices, select **.mobi** as the file type.
 - To create a file for testing on iOS, select **.azk** as the file type.

Sideload to Fire tablets and Kindle E-readers:

- a. Connect your Fire tablet or Kindle E-reader to your computer using the USB cable and open the device's **Internal Storage** file folder.
- b. Drag your .mobi file into the **Documents** folder and then unplug your device. Your book should appear in the Kindle application. You may have to change the content settings or open the book directly from your device's **Documents** application.

Sideload to Android devices:

- a. Connect your device to your computer using the USB cable and open the device's **Internal Storage** file folder.
- b. Drag your .mobi file into the **Kindle** folder and then unplug your device. Your book should appear in the Kindle application. You may have to change the content settings or open the book directly from your device's **Documents** application.

Sideload to Apple devices (iOS):

- a. Open iTunes on your computer and select your device.
- b. Select **Apps** along the sidebar and scroll down until you see a list of applications.
- c. Select **Kindle** and a list of Kindle documents appears next to the applications list.
- d. Select **Add File** and add the .azk file you wish to preview on iOS.

Note: When testing Kindle Edition with Audio/Video content, the audio and video cannot be previewed.

Consider device compatibility. Keep in mind that users may wish to read your content on an extremely wide variety of devices, with very small or large screens and low or high resolution. Try to test your content on as diverse a selection of devices as possible, especially for complex Kindle books.

Once you can read your book, use this checklist to confirm that your Kindle book does not contain blatant errors.

1. Open the book for the first time or go to the cover page.
 - o **Cover:** The Kindle book should have a cover.
 - o **Single Cover:** From the cover, flip to the next page. There should not be another image of the cover page.
2. Go to the table of contents (where applicable).
 - o In the table of contents, each item should be clickable and should link to the correct location in the book. There should be no page numbers in the TOC.
3. Go to any location in the book (reflowable eBooks only).
 - o **Font size:** Change the font size in the Kindle menu; the book font should change accordingly. Regular text should not be bold or italicized.
 - o **Typeface:** Change the typeface in the Kindle menu; the book font should change accordingly. If you have designed your book to use only a specific font file, make sure that you have followed guidelines in section 9.3.8 Using Embedded Fonts. Not following these guidelines could lead to the Kindle settings reverting to the customer's preferred reading font.
4. Go back to the first page and flip through every page of the book.
 - o **Images:** Images should not be too small. Make sure that all text in images is legible. Large pictures should be scaled to fit the page and display in their entirety on one screen.
 - o **Tables:** Tables should appear correctly. Make sure that all text in tables is legible.
 - o **Material only included with physical book:** There should not be any references to material (such as a CD or DVD) that is only included with the physical book.
 - o **Background settings (re流able eBooks only):** On a Fire tablet or Kindle Previewer, confirm that your text is legible in all background color modes (white, black, mint, and sepia).
 - o **Magnification (fixed-layout only):** Activate pop-ups/panel view and check that all text content and/or panels have corresponding magnification, no content is overflowing the edge of the screen, and magnified reading order is correct.

Part III. Guidelines for Specific Types of eBooks

To skip to a specific eBook format, use the following hyperlinks:

- Section 9: Creating Text-Heavy Fiction and Non-Fiction eBooks (Reflowable)
- Section 10: Creating Fixed-Layout Books with Text Pop-Ups
- Section 11: Creating Fixed-Layout Books with Image Pop-Ups or Virtual Panels
- Section 12: Creating Fixed-Layout Books Without Pop-Ups
- Section 13: Creating Kindle Edition with Audio/Video Content
- Section 14: Creating Dictionaries

9 Creating Text-Heavy Fiction and Non-Fiction eBooks (Reflowable)

Amazon refers to text-heavy fiction and non-fiction eBooks as "reflowable" because this type of content reflows when an eBook's text settings are changed. In general, a book can be converted as a reflowable eBook when the body text can be easily separated from the images without losing any context or important layout design.

The reflowable format supports a number of features that allow readers to interact with and customize the way the text appears on their devices. These features include dictionary, X-Ray (when available), text-to-speech (when available), Word Wise (when available), Kindle Real Page Numbers (when available), and the ability to change text and formatting settings. For an example of a reflowable book, see the KF8 example at www.amazon.com/kindleformat (under the **KindleGen Examples** heading in the sidebar).

9.1 Metadata Guidelines

eBooks are reflowable by default. Reflowable eBooks do not need to specify `meta name="book-type"` in the OPF file.

9.2 Layout Guidelines

Create the content using single column layout. Do not use the CSS `position:` property for alignments.

9.3 Text Guidelines

9.3.1 Specify Heading Alignment and Justification

Because text in reflowable eBooks is fully justified by default (i.e., `text-align: justify;`), Amazon strongly recommends specifying the appropriate CSS alignment for all headings to prevent excessive spaces between words (i.e., `text-align: left; text-align: right; text-align: center;`).

9.3.2 Body Text Must Use Defaults

The body text in a reflowable Kindle book (fiction and non-fiction) must be all defaults. Amazon encourages content creators to use creative styles for headings, special paragraphs, footnotes, tables of contents, etc., but not for body text. For guidance on using embedded fonts, refer to section 9.3.8. The reason for this is that any styling on body text in the HTML will override the user's preferred default reading settings. Users report such behavior as a poor reading experience. Here are the most important points:

- The body text font should be set in the CSS using the `font-family` attribute. Body text must use the default font size (1em) and line height. Body text should not use the `` tag or the `font-size` and `line-height` attributes in CSS.
- Body text should not be primarily bold or italicized. Selected parts of the text can be bold or italicized for emphasis. This guideline only prohibits a book from being entirely bold, for example.
- Body text should not have an imposed font color throughout the book. If you prefer to use imposed font color in some sections of your book, do not use too light or too dark a color. Light colors will not display with enough contrast on devices set to white backgrounds or on E-reader devices. Dark colors will not display well on devices set to black backgrounds. See the W3C recommendation described [here](#) for maintaining a readable contrast ratio between text and background colors. For grays, use colors within the hex value range of #666 to #999.
 - To determine if a color falls within this range, convert your color to RGB values using a tool such as <http://hex-color.com/>. Plug the resulting three numbers into the following formula: $Y = (0.2126 * R) + (0.7152 * G) + (0.0722 * B)$. If the value of Y falls within a range of 102 and 153, this color will create a good customer experience across Kindle devices and applications.

In a book with Enhanced Typesetting enabled, Kindle readers can be sure that any text of any color that appears above any background color will be legible. Font colors will adapt automatically to provide sufficient contrast with either the device color theme chosen by the reader or to the background color of any element. In the below example, the same colors ("yellow", "black", and "orange") were applied to both the font and their background container; notice how the font color changes to provide readable contrast with the background. To learn more about Enhanced Typesetting, see section 15.



- Body text must not have a black or white background color. Customers report this as a bad user experience because it can create an awkward, boxy reading experience when the device background is set to a different color and because the text can become invisible when a user changes the background color setting on their device and the font color automatically inverts.
- Body text should not have a forced font face. Make sure that you have followed guidelines in section 9.3.8 Using Embedded Fonts. Not following these guidelines could lead to customers not having the ability to change their preferred reading font.
- Body text must not use non-breaking spaces in place of normal spaces in between words in paragraphs.

- Body text must not have an imposed left/right margin or padding throughout the book. If there are paragraphs that do require left/right margin to differentiate them visually from body text, such as a recipe list or a block quote, margins applied to these sections should be specified as percentages rather than ems or point values.
- The following font fixes will be applied in during the upload process:
 - The font size used in the majority of the content will be normalized to 1em.
 - The font-family used in the majority of the content will be moved to the root tag (body text).
 - Forced font colors used in body text will be removed so the user may change the color of the text.

9.3.3 Formatting Paragraphs

For body text, either indents or extra line spacing must be used to distinguish paragraphs for customers. Amazon recommends using the `text-indent` attribute in the CSS to set indent values of no more than 4 ems for body paragraphs.

To change the space before or after each paragraph, use the `margin-top` or `margin-bottom` styles respectively in the CSS. We recommend using em values for these attributes.

Never use the `height` property to control the size of elements containing text or instances of overlapping text may occur in your book. The `height` property should only ever be applied to images in reflowable books.

9.3.4 Avoid Using Fixed Values for Most Elements

Avoid using fixed values such as points and pixels for CSS properties such as `font-size`, `width`, `height`, `margin`, `padding`, `text-indent`, and `line-height`. To enable rendering across various screen sizes and resolutions, specify these values in ems or percentages.

For software compatibility, Amazon requires that non-body text in reflowable books have a `line-height` value of at least 1.2 em or 120%.

9.3.5 Margin and Padding Formatting

When using left or right `margin` and `padding` CSS properties, specify the values in percentage (%) instead of em units. This ensures that the margins do not grow too wide with large font sizes and impair reading. Margins should be assigned values of 0 or greater to keep content from falling off the edge of the screen or overlapping other content. Always set left and right margins to 0 for normal body text to allow users the full range of margin selection using device defaults. Top/bottom margins should be specified in ems so that spacing between paragraphs is easily distinguishable at any font or device size.

9.3.6 Drop Caps

Elements such as drop caps should be specified using percentages or relative units (positive or negative) instead of fixed values such as points and pixels. The top of the drop cap should be aligned with the body text. To create drop caps, Amazon recommends using the following sample CSS:

Example:

```
p.para {
    font-size: 1em;
    margin-bottom: 0;
    margin-top: 0;
    text-align: justify;
```

```

text-indent: 0;
}

@media amzn-kf8
{
    span.dropcaps
    {
        font-weight: normal;
        font-size: 320%;
        float: left;
        margin-top: -0.3225em;
        margin-bottom: -0.3245em;
    }
}

@media amzn-mobi
{
    span.dropcaps
    {
        font-size: 3em;
        font-weight: bold;
    }
}

<p class="para"><span class="dropcaps">T</span>his is a sample

```

To verify that the drop caps display as intended, test the book as described in section 8.1, Testing Kindle Books. The following is an example of a drop cap formatted using this method in a book with Enhanced Typesetting enabled (to learn more about Enhanced Typesetting, see section 15):

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec luctus bibendum enim et tristique. Aliquam non eros in nulla vestibulum lobortis. Nulla facilisi. In dictum pulvinar nulla in ultricies. Suspendisse nec gravida tortor. Pellentesque rutrum, lacus vel vehicula lobortis, elit nisl feugiat lectus, at consequat nibh dui in leo. Pellentesque rutrum, magna ut rhoncus finibus, justo nulla fermentum mi, vel interdum mi erat at velit. In iaculis augue sit amet augue elementum, eu mattis elit commodo. Phasellus auctor dui eget sodales lacinia. Etiam magna

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec luctus biben-

Small font setting

Large font setting

9.3.7 Use CSS for Page Breaks

Do not insert blank lines of text to create page breaks. Use the CSS `page-break-before` and `page-break-after` attributes. Alternatively, place each section of content that should appear after a page break in a new HTML document.

9.3.8 Using Embedded Fonts

Kindle Format 8 supports embedded fonts within the eBook. These fonts can be either Open Type (OTF) or True Type (TTF). Kindle does not recommend the use of Type 1 (Postscript) fonts. To provide Kindle customers with the best possible reading experience, reflowable books that use Type 1 fonts are rendered using Kindle fonts by default. On KF8-enabled devices and applications, customers have the option to turn publisher-provided fonts on or off.

It is the responsibility of the publisher to secure the appropriate license rights for fonts. Unless embedded fonts are necessary to convey intent, Amazon recommends using the default set of fonts installed on Kindle devices and applications because they have been tuned for high quality rendering.

Only embed fonts that are not currently available on Kindle devices and applications. When selecting a font, consider usability for visually impaired readers and select a simple, clear font which will contrast well against all tablet and E-reader backgrounds.

Kindle also supports a monospaced font. Content in the following tags will be rendered in monospaced font: `<pre>`, `<code>`, `<samp>`, `<kbd>`, `<tt>`, ``, ``.

With the exception of `<pre>`, the tags listed above do not change the text alignment. If the content in these tags should be right-aligned, wrap the tags listed above in a `<div>` styled with CSS using `text-align:right`.

9.3.9 Customizing Font Selection

The primary or main font in a book should be set at the `<body>` level. If you prefer to use additional text styling such as bold or italics, ensure that the styles are set on the text rather than the font so that any font that the customer selects correctly displays these styling elements. Below are examples of both correct and incorrect implementation of customizing fonts in a Kindle book.

Incorrect HTML Code	Correct HTML Code
<pre> <html> <body> <p style="font-family:PrimaryFont"> Primary font content</p> <p style="font-family:SecondaryFont"> Secondary font content</p> <p style="font-family:PrimaryFont"> Primary font content</p> <p style="font-family:PrimaryFont"> Primary font content</p> </body> </html> </pre>	<pre> <html> <body style="font-family:PrimaryFont"> <p>Primary font content</p> <p style="font-family:SecondaryFont"> Secondary font content</p> <p>Primary font content</p> <p>Primary font content</p> </body> </html> </pre>

The same behavior can be achieved by using CSS classes as shown below.

Incorrect CSS Code	Correct CSS Code
<pre>body{ font-size: asize; } .indent { font-size: asize; font-family: PrimaryFont; } .sidebar-text { font-family: SecondaryFont; font-weight: bold; }</pre>	<pre>body { font-family: PrimaryFont; font-size: asize; } .indent { font-size: asize; } .sidebar-text { font-family: SecondaryFont; weight: bold; }</pre>

When coding fonts, make sure that HTML tags are closed correctly to avoid an override conflict. When there is an override conflict, the font files within the book will be intentionally removed to provide Kindle customers with the best possible reading experience when they select the font settings.

For example:

Incorrect HTML code	Correct HTML code
<pre><html> <body style="font- family:PrimaryFont"> <p>Primary font content</p> <div style="font- family:SecondaryFont"> Secondary font content. <div style="font-family:ThirdFont"> Third font content </div> </div> <p>Primary font content</p> </body> </html></pre>	<pre><html> <body style="font-family:PrimaryFont"> <p>Primary font content</p> <div style="font- family:SecondaryFont"> Secondary font content. </div> <div style="font-family:ThirdFont"> Third font content </div> <p>Primary font content</p> </body> </html></pre>

Incorrect CSS code	Correct CSS code
<pre> h2.title, h3.title { text-indent:0; text-align:center; font-family:'PrimaryFont'; } h3.title { font-family:'SecondaryFont'; font-size:2em; font-weight:bold; } </pre>	<pre> h2.title { text-indent:0; text-align:center; font-family:'PrimaryFont'; } h3.title { text-indent:0; text-align:center; font-size:2em; font-weight:bold; font-family:'SecondaryFont'; } </pre>

9.3.10 Page Number Guidelines

Kindle books do not always map directly to page numbers in physical editions of the book. Even if the Kindle Real Page Numbers feature is activated in the Go To menu, references to page numbers within the eBook should be handled as follows:

- Table of contents: If there are page numbers in the print source's TOC, they should be removed in the digital conversion. The name of the section should be retained and hyperlinked to the relevant location in the eBook. For example, if a print source TOC displays the entry "Chapter 1 ... P. 36", then the eBook should only display "Chapter 1" hyperlinked to the correct digital location.
- Internal links: If there is text that refers to another page in the eBook, such as "see page XX", this text should be linked to the relevant paragraph within the eBook.
- Index: Every page number in the index should be linked to the relevant paragraph in the eBook (or the relevant illustration, table, or chart).
- Links within index: If there is an entry that references another section of the index, such as "see also XXX", this text should be linked to the relevant section within the index.

9.3.11 Footnote Guidelines

Amazon strongly recommends marking footnotes with the HTML5 `aside` element, together with the `epub:type` attribute. This allows accessible reading systems to ignore the footnotes except when followed by their referents and allows any reading system to handle them more intelligently (e.g., as pop-ups). This usage ensures that even if the EPUB semantic is not recognized, the notes will still be treated as secondary content due the nature of the HTML5 `aside` element.

Regardless of whether the `aside` element is used, Amazon requires formatting footnotes with bi-directional hyperlinks (the text is linked to the footnote and the footnote is linked back to the text). This makes it easier for customers to return to the text after viewing the footnote. On some Kindle devices, such as Kindle Paperwhite, footnotes with bi-directional hyperlinks are displayed in a pop-up. For a better reading experience, Amazon strongly recommends placing the footnote text at the end of the chapter or book.

Define footnotes using either of the following methods:

Method 1 (preferred):

```
<p>This footnote example uses the aside element with the epub:type attribute and bi-directional hyperlinks.<sup><a id="source" href="#ft-1-1" epub:type="noteref">1</a></sup></p>

...
<aside id="ft-1-1" epub:type="footnote">

<p><a epub:type="noteref" href="#source">1.</a> This is the footnote text, which should be placed at the end of the chapter or book.</p>

</aside>
```

Method 2:

```
<p>This footnote example uses bi-directional hyperlinks only.<sup><a href="footnotes.html#fn1" id="r1">[2]</a></sup></p>

...
<p id="fn1"><a href="chapter01.html#r1">2.</a> This is the footnote text, which should be placed at the end of the chapter or book.</p>
```

9.4 Image Guidelines

These guidelines apply to reflowable fiction and non-fiction books, but are not applicable to image-intensive fixed-layout children's books (see section 10) and fixed-layout graphic novels/manga/comics (see section 11). For cover image guidelines, see section 4.

9.4.1 Use Supported Input Formats

The Kindle platform supports GIF, BMP, JPEG, non-transparent PNG, and Scalable Vector Graphics (SVG) images.

When using images for schemas, charts, tables, maps, or anything that includes text, pay special attention to the legibility of the final image.

Add images to the source using the standard HTML `` tag. If the image is meaningful to the content, use the `alt` attribute to provide text that conveys that meaning to customers who use assistive technology. The `alt` text should be less than 140 characters and should describe the image and its meaning. If the image is decorative and not meaningful to the content, set the `alt` attribute to null with `alt = ""` so that it can be ignored by assistive technology.

Important: Use RGB as the color profile when saving your files. Kindle does not support sRGB or CMYK.

9.4.2 Image Size and Quality Standards

Images must meet the minimum quality standard of 300 ppi for the intended display size. The minimum standard for a full-page image in a book after allowing for margins, running heads, page numbers, and captions is an image size of 4" by 6". At 300 ppi, this image must be a minimum of 1200 x 1800 pixels. Refer to the following chart for the minimum standards for the scaling of images.

Display size	Width x Height (in)	PPI	Width x Height (pixels)	Total Pixels (Megapixels)
Full Page	4" by 6"	300	1200 x 1800	2.16
¾ Page	4" by 4.5"	300	1200 x 1350	1.62
½ Page	4" by 3"	300	1200 x 900	1.08
¼ Page	2" by 3"	300	600 x 900	0.54
Small	2" by 1.5"	300	600 x 450	0.27

The maximum file size of an EPUB is 650 MB. KindleGen performs automatic image conversions to optimize the content for Kindle.

See section 9.4.5 regarding exceptions for images that are only available in low-resolution such as historical photographs.

9.4.3 Image Dimensions for Responsive Layouts

Amazon recommends that block and float images be styled using a percentage value for the `width` style attribute. This will ensure that images always occupy the same percentage of space on the screen irrespective of device resolution.

Inline images should be sized in em units so that they scale in relation to the text around them when users adjust the font size of their reading system.

9.4.4 Use Color Images

For the best user experience across Kindle devices and applications, use color images whenever possible and relevant. If an image is a photograph, it should be formatted as a JPEG.

Even in marketplaces where only E-reader devices are currently available, use color images when possible for future compatibility.

9.4.5 Photographs Should Be Optimized for High-Resolution Devices

Photographs should use the JPEG format and be saved at high quality. Photographs should use the highest resolution available within the file size limit.

Photographs of less than 300 x 400 pixels will be scaled based on the device resolution and may become blurry as a result. To display a smaller image provide a larger image and use CSS to shrink to the desired size.

Amazon recommends that images display clearly at 2X magnification across devices. This means that if an image is intended to display at full width on device, its width should be captured at 3200 px (this is twice the width of our highest resolution device, the Kindle Fire HDX 8.9"). Smaller images can be resized accordingly.

If the photographs are in GIF format or are too small, converting them to JPEG or artificially increasing the size does not improve the quality. Go back to the original source to create a JPEG image with sufficient resolution.

Some images, such as historical photographs, may not be available at 300 ppi or greater. In these situations, provide the best image quality possible. Amazon strongly recommends images meet a minimum of 300 ppi. Any images below 72 ppi will cause the book to fail conversion.

9.4.6 Use GIF or PNG for Line-Art and Text

Line-art images are graphics drawn with a limited number of solid colors (such as images drawn by Adobe Illustrator, Microsoft Paint, or Microsoft Power-Point, including black-and-white drawings). Text, graphics, charts, and tables are examples of images that are line-art.

Line-art should be in GIF or PNG format. The JPEG algorithm tries to blend parts of the image together, and blurs the sharp edges of the line-art, causing the image (and any text it contains) to be blurry.

Text appearing in line-art images should be sharp and legible.

Optimize line-art GIFs before submitting them to KindleGen. Resizing or JPEG compression introduces blurriness or unwanted artifacts in line-art images, which is why Amazon insists on GIF or PNG file formats for line-art.

To optimize GIFs and PNGs and make them fit the image size limit, try the following tips:

- Try reducing the number of colors used. This can often be done without altering the quality of the image. Line-art images that appear to be black and white might actually be in color because of certain anti-aliasing algorithms. Here is an example (notice the shades of red and blue around the "A" in the left picture):



- Remove white margins around the image, if any exist. When cropping, consider how the image will look on devices set to white, sepia, mint, and black backgrounds.
- Resize the image, if necessary, but pay close attention to the legibility of text. (see section 9.4.7, Image and Font Size Requirements for Line-Art and Text).

9.4.7 Image and Font Size Requirements for Line-Art and Text

An image containing text should not be significantly larger than a Kindle screen. The Kindle E-reader devices offer the possibility to rotate an image to use more screen real estate. The Fire tablets and the Kindle for iPhone application allow zooming and panning.

- The MINIMUM size of text is 6 pixels for the height of a lowercase "a." The image itself will need to be larger than 6 pixels in height if there is any extra space above or below the "a." For an image that contains only a single line of text, such as the example below, the image should be at least 45 pixels in height so that it displays proportional to surrounding text content.

$$p_t = d_t + \delta_1 d_{t+1} + \delta_1 \delta_2 d_{t+2} + \delta_1 \delta_2 \delta_3 d_{t+3} + \dots,$$

9.4.8 Prefer HTML to Images

Do not render large chunks of text as images. If text can be separated from the surrounding art it should not be an image. Instead, it should be HTML.

The following is an example of a text-heavy image that should be HTML.

Note: The image would be shrunk to fit the screen and become unreadable, while an HTML version would be paginated.

- 
1. Turn It Off
 - Turn off lights, cooking equipment, and exhaust fans when they are not being used.
 - Activate the standby mode for office equipment, in-house computers, and printers to effectively put these pieces of equipment "to sleep" when not in use.
 2. Keep It Closed
 - Keep refrigerator doors closed.
 - Keep back doors, if any, to the kitchen closed to minimize heat and cooling loss.
 3. Turn It Down
 - Set air-conditioning units at 76°F for cooling.
 - Set heating systems at 68°F for heating.
 - Reduce the temperature of your hot water heater (where appropriate).
 - Adjust heating/cooling temperature settings when you close your operation for the night.
 4. Vent It
 - Use ceiling fans to help recirculate dining room air.
 - Retrofit exhaust hoods with both low and high speed fans, in dishroom areas and in food preparation and cooking areas.
 5. Change the Bulbs
 - Replace incandescent bulbs with fluorescent. They use 75% less electricity and last 10 times as long.
 - Install photocell light sensors (motion detectors) where appropriate (storage areas and the like) to activate lighting only when needed.
 6. Watch the Water
 - Run dishwashers only when they are full.
 - Replace/repair leaking faucets immediately.
 - Insulate all hot water pipes.
 - Install "water-saver" spray nozzles in dish areas.
 7. Cook Right
 - Stagger preheat times for equipment to minimize surcharges for high energy use.
 - Bake during off-peak periods.
 - Idle cooking equipment (between meal periods) at reduced temperatures where appropriate.
 8. Seal It
 - Caulk and weatherstrip cracks and openings around doors, windows, vents, and utility outlets.
 - Check freezer, refrigerator, and walk-in seals and gaskets for cracks or warping. Replace as needed.
 9. Maintain It
 - Change air filters on a regular basis (monthly during peak heating and cooling seasons).
 - Clean grease traps on ventilation equipment.
 - Clean air-conditioner and refrigeration condenser/evaporator coils at least every three months.
 - Oil, lube, clean, and repair equipment as needed to maximize operating efficiency.
 10. Get Help:
 - Take advantage of any advisory services offered by your local utility company and governmental agencies.
 - Talk to your heating, ventilation, and air-condition (HVAC) repair person for tips on minimizing energy and maintenance costs with your particular HVAC system. It's like getting a free energy management consultant!

9.4.9 Positioning Image Captions

Amazon recommends placing a caption below the related image, so that the reader views the image before the caption. Place the caption in a separate `<div>` tag so that it displays below the image.

Example:

```

<div>This is a caption</div>
```

9.4.10 Controlling Image Aspect Ratio

To preserve aspect ratio of images, width and height cannot both be set to a fixed percentage. Either width or height can be set to the fixed percentage (such as 100%), but then the other property should be set to "auto" to preserve the aspect ratio.

9.4.11 Displaying Text Correctly within SVG

To display text correctly within an SVG, use the font-size attribute for <text> inside the SVG.

Example:

```
<html>
<body>
<svg xmlns="http://www.w3.org/2000/svg" version="1.1">
<text x="20" y="20" font-size=20 fill="red">svg text sample</text>
</svg>
</body>
</html>
```

9.4.12 Use Supported SVG Tags and Elements

A publisher can reference the SVG files from within an HTML file using inline <svg>, , <embed>, or <object> tags. Refer to the SVG specification <http://www.w3.org/TR/SVG/> for details about SVG. SVG with animation is not supported. SVGs are not supported in iOS. Enhanced Typesetting does not support SVG images.

Example:

```
<html>
<body>
<svg xmlns="http://www.w3.org/2000/svg"><!--NOTE: Inline SVG--></svg>

<embed src="svgfile2.svg"/>
<object src="svgfile3.svg"/>
</body>
</html>
```

Supported SVG Elements:

<circle>	<marker>	<rect>
<defs>	<metadata>	<style>
<ellipse>	<path>	<svg>
<feColorMatrix>	<pattern>	<text>
<filter>	<polygon>	<use>
<line>	<polyline>	

Reference: <http://www.webkit.org/projects/svg/status.xml>.

9.5 Table Guidelines

9.5.1 Avoid Large Tables

Amazon recommends using HTML <table> layouts for tabular content and not rendering tables as images.

A table rendered as an image cannot be paginated because the entire image is displayed on one screen. If the table is rendered using HTML <table> tags, pagination is available and users can cursor through the cells in the table. If the table is significantly wider than the screen and forces panning, it creates a poor user experience.

For the best user experience, tables should not contain whole paragraphs of text or large pictures in a cell.

If a table is too large or contains too much text in its cells, consider reformatting it in a way that optimizes for readability. Single columns of HTML text provide the best reading experience for customers using a variety of font sizes. Amazon recommends keeping tables below 100 rows and 10 columns for devices of all sizes.

If the table must be rendered as an image, refer to section 9.4 Image Guidelines and section 9.5.3 Split Tables as Needed.

9.5.2 Create Simple HTML Tables

Use the <table> tags to create simple tables with standard rows and columns that can be displayed on Kindle devices and applications. KF8 has support for nested tables and merged cells, but Amazon recommends that publishers use this judiciously and only when necessary.

Colspan and rowspan attributes should be less than or equal to the total number of columns or rows (as appropriate) in the table.

Avoid negative margins in the table content for better readability.

9.5.3 Split Tables as Needed

There are times when it may be necessary to format a table as an image, but the image is still too large to be legible on one Kindle screen. In this case, it is a good idea to split the image. The following example is a guideline to use when splitting a 2-page table. This logic can be extended for multiple-page table images.

Example: Split the image in half horizontally 60% of the way down the image, then split the header, copy it to the bottom half of the image, and stitch these into a new image. The final two images should then be the same size, with table headers.

Revise the source image, not the converted GIF; otherwise, the image will be converted into GIF format twice, which might result in lower quality.

9.5.4 Table Features with Enhanced Typesetting

If an eBook has Enhanced Typesetting enabled, an enhanced Table Viewer experience will be enabled for readers on tables with more than three columns by double-tapping on the table. Table features with Enhanced Typesetting include:

- Customers do not experience any data loss when reading tables. Text in tables is redistributed if it does not fit on the page and is not cropped on the screen edges.

- Enhanced Typesetting avoids excessive wrapping of text by using additional white space on the page to redistribute column widths based on the screen size. Minimum padding between rows and columns is always maintained to preserve proportional row and column boundaries for any font size or device type.
- Customers can navigate through multi-page tables with the additional context of a continuation indicator.
- Customers can interact with a table that may have spanned multiple pages in a single view inside the Enhanced Typesetting viewer with panning, zooming, text highlights, and text lookup available.

Best practices for utilizing Enhanced Typesetting with tables:

- Use a table structure of `<thead>`, `<tbody>`, `<tfoot>`.
- Do not add empty columns to provide extra padding.
- Use inline images instead of block images.

Example:

```
<table class="defaultcontent" bordercolor="#E66C2C" border="1" cellpadding="4" p align="left">

<thead>

<tr>

<th align="left"><i>Lorem ipsum</i></th>

<th align="left"><i>Dolor sit</i></th>

</tr>

</thead>

<tbody>

<tr>

<td><b>amet</b> amet</td>

<td><b>amat</b> amerat</td>

</tr>

...

</tbody>

<tfoot>

<tr>

<td><b>sedi</b> sed</td>

<td><b>seda</b> sad</td>

</tr>

</tfoot>

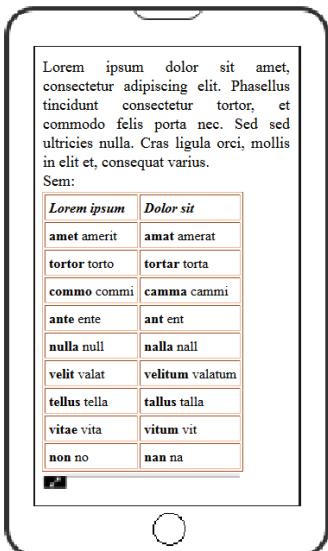
</table>
```

```

</tr>
</tfoot>
</table>

```

Enhanced Typesetting will utilize the space on the page to avoid wrapping text and display a clear readable table.



10 Creating Fixed-Layout Books with Text Pop-Ups

Certain books have elements with fixed dimensions and text positioning that do not allow fonts to be resized or text to be reflowed. For example, coffee table books and children's picture books have full-page images with text set precisely in relation to the background art, although this format is not exclusive to these types of books.

Fixed-layout books do not support reflowable text and should only be used when the entire book is well-suited to a fixed-layout format; books cannot be partially reflowable or partially fixed-layout. For details on creating this type of eBook with Kindle Kid's Book Creator, see section 2.2.5.

Important: Nested anchor tags are not supported in fixed-layout books. Fixed-layout books with nested anchor tags will be suppressed.

10.1 Metadata Guidelines

The OPF file specifies metadata necessary for fixed-layout books. For a demonstration, see the children's book example at www.amazon.com/kindleformat (under the **KindleGen Examples** heading in the sidebar). This example is a demonstration of how to create content to take advantage of fixed-layout with Region Magnification. It is not intended to be an HTML tutorial.

While similar, the various types of fixed-layout formats have key differences. Unless explicitly stated, guidance for fixed-layout books with text pop-ups should not be applied to any other format, such as fixed layout books with image pop-ups or Virtual Panels.

Metadata	Description
<p>Layout can be specified using one of the following metadata fields:</p> <p>1) <meta property="rendition:layout">pre-paginated</meta></p> <p>2) <meta name="fixed-layout" content="true"/></p>	<p>Required. Identifies the book as having a fixed layout.</p> <p>Valid values for <code>rendition:layout</code> metadata are <code>reflowable</code> or <code>pre-paginated</code>. The default value is <code>reflowable</code>.</p> <p>Valid values for <code>fixed-layout</code> metadata are <code>true</code> or <code>false</code>. The default value is <code>false</code>.</p>
<p><meta name="original-resolution" content="1024x600"/></p>	<p>Required. Identifies the original design resolution of the content ("1024x600" is only an example). The pixel dimensions can have any positive integer value. These values must be in proportion to the overall aspect ratio of the original content.</p>
<p>Orientation can be specified using one of the following metadata fields:</p> <p>1) <meta property="rendition:orientation">landscape</meta></p> <p>2) <meta name="orientation-lock" content="landscape"/></p> <p>Note: This is not currently supported in iOS.</p>	<p>Optional (but recommended).</p> <p>Valid values for <code>rendition:layout</code> metadata are <code>portrait</code>, <code>landscape</code>, or <code>auto</code>. Locks the orientation of the book to either portrait or landscape. If the value is <code>auto</code>, both portrait and landscape modes are supported. The default value is <code>auto</code>.</p> <p>Valid values for <code>orientation-lock</code> metadata are <code>portrait</code>, <code>landscape</code> or <code>none</code>. Locks the orientation of the content to either portrait or landscape. If the value is <code>none</code>, both portrait and landscape modes are supported. The default value is <code>none</code>.</p>

Metadata	Description
<meta name="primary-writing-mode" content="horizontal-rl"/>	<p>Optional. Defines page rendering order, reading mode, and reader navigation (including Kindle Text Pop-Up, Kindle Panel View, and Kindle Virtual Panels). Valid values are horizontal-lr, horizontal-rl, vertical-lr, and vertical-rl.</p> <p>The default behavior is horizontal-lr when the page progression direction is left-to-right or not specified. Use the value horizontal-rl to set the page progression direction to right-to-left.</p> <p>Use the value vertical-rl to set a page progression direction of right-to-left for Chinese, Japanese, and Korean books.</p>
<meta name="book-type" content="children"/>	<p>Optional for children's books. Removes reader functionality (e.g., share) which may not be relevant for certain books such as children's eBooks. Valid values are children or comic.</p>

10.2 Cover Image Guidelines: Including Back Cover for Children's Content

While Kindle books in reflowable format do not use back covers, it provides a sense of closure to the narrative for children's content. It is best to include a back cover as part of the design of children's books. (Non-children's books that use this format do not need to provide a back cover.) Remove barcodes, price listings, and promotional content from the back cover image. Text pop-ups are required for story text on the back cover and recommended but not required for other back cover text.

10.3 Text Guidelines: Including Specific Fonts

Fixed-layout titles do not allow users to choose and vary fonts. Using CSS @font-face and packaging fonts with the title guarantees book design look-and-feel to be consistent across all devices and screens. This not only ensures that the exact fonts used for the source are used in the fixed-layout title, but that HTML text has more fluid rendering between the page view and the Region Magnification view.

Example:

```
@font-face {
    font-family: "Arial"; /* assigns the name of the font to use */
    src: url(..../fonts/arial.otf); /* includes the file for the correct font */
}
```

10.4 Content Requirements

10.4.1 Requirement #1: Using HTML File Structure

Fixed-layout content must have a single HTML file for each page represented on a Kindle device. This can be accomplished by using one image in the HTML file or by using the HTML file to stitch two images together to be viewed as one when orientation-lock is set to landscape.

Portrait orientation lock:

1 print page = 1 HTML file

Example:



Landscape orientation lock:

2 print pages (1 two-page image) = 1 HTML file

Example:



10.4.2 Requirement #2: Using Region Magnification (Pop-Ups)

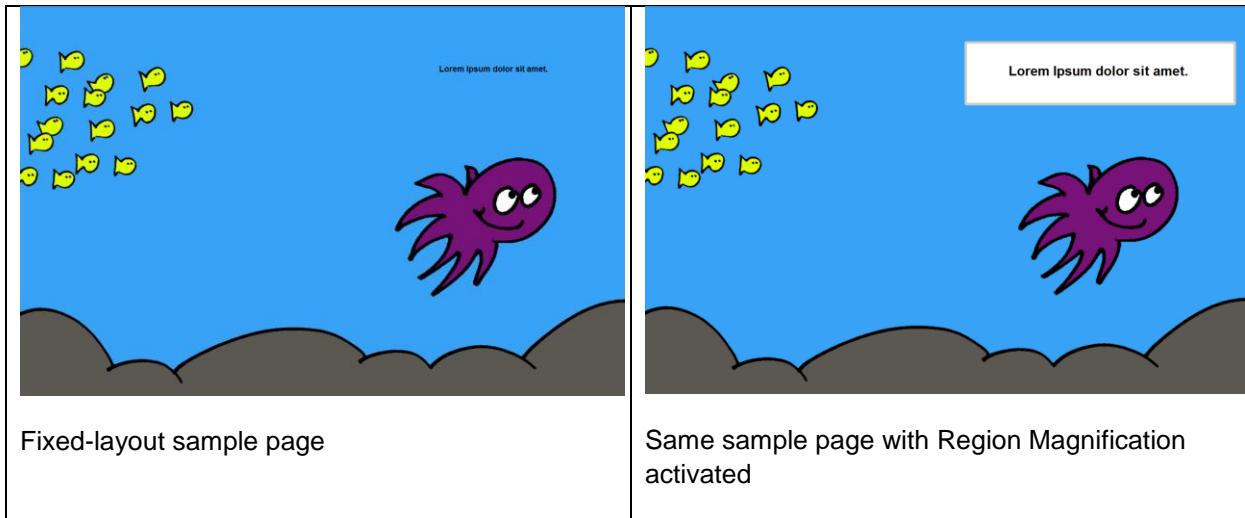
Fixed-layout content does not allow the user to change the font size; allowing font sizes to change could obfuscate content relevant to storytelling. Kindle uses Region Magnification (pop-ups) to enlarge fixed-

layout text without altering the original layout. For an example of Region Magnification, see the image near the end of this section.

The user activates Region Magnification by double tapping an “active area” on touch screen devices. (On non-touch screen devices, clicking the up arrow on the 5-way controller selects the region and clicking the center button activates Kindle Text Pop-Up or Kindle Panel View.) During Region Magnification, the active area (source element) is hidden and the magnification area (target element) is displayed. When an eBook is set up to support Region Magnification, KindleGen automatically detects the Region Magnification code and sets the Region Magnification metadata value in the OPF file to “true”.

To support Region Magnification, the following steps are required:

1. Set the active area by creating a well-defined HTML anchor (`<a>`) element around the text to be enlarged. The anchor must specify the `app-amzn-magnify` class. The anchor should also have the following attributes stored in a JSON object (http://www.w3schools.com/json/json_syntax.asp) as part of the `data-app-amzn-magnify` value:
 - a. `"targetId": "<string:elementId>"` = unique element id of the magnification area (position and font size are set in CSS file)
 - b. `"sourceId": "<string:elementId>"` = unique element id of the source that will be magnified
 - c. `"ordinal": <integer:reading order>` = reading order of the magnification areas (the order in which panels appear as part of the reading flow). This is required for all text that uses Region Magnification.
2. When magnification is activated, the source text is no longer displayed. Create a target `<div>` element that is aligned to completely cover the text being magnified and positioned to minimize covering the background art of the page. This ensures that when a user activates Region Magnification, the source text will not disappear from the page view. It is also important to not position a pop-up directly abutting the right or bottom edges of the screen. Differences between device types can create content overflow error if pop-ups are too close to these edges. Check content on as many different kinds of devices as possible before publishing.
3. The font size of text in the Region Magnification `<div>` should be set to 150% of the regular font size on the page. There are several exceptions to this:
 - One exception is when the text on the page is so large that magnifying it to 150% would make it harder to read instead of improving readability. Region Magnification is not necessary for text with a height of at least 4mm in children’s content or a height of at least 2mm in non-children’s content on a 7" device.
 - Another exception is when the text on the page needs to be increased by more than 150% to improve readability in the Region Magnification `<div>`. For example, if the font size of the text on the page is 45%, the font size of the text in the Region Magnification `<div>` may need to be magnified to 225% to be readable.



Example:

```
<div id="fs3-1-org" class="txt fs3-txt1">  
  
<a class="app-amzn-magnify" data-app-amzn-magnify='{"targetId":"fs3-txt1-magTarget",  
"sourceId":"fs3-1-txt", "ordinal":2}'>  
  
<p id="fs3-1-txt">Lorem ipsum dolor sit amet.</p></a></div>  
  
...  
  
<div id="fs3-txt1-magTarget" class="target-mag fs3-txt1"></div>
```

10.5 HTML and CSS Guidelines

10.5.1 Applying CSS Reset

Apply a CSS reset to fixed-layout books. A CSS reset removes the inconsistent styles that browsers automatically apply, such as font sizes, margins, etc. Adding a CSS reset, such as the YUI reset (<http://yuilibrary.com/yui/docs/cssreset>), removes these inconsistencies, allowing designers to build on a dependable styling template.

10.5.2 CSS Files For Fixed-Layout Books

To increase page-turn performance on fixed-layout books, CSS files may be split so that each group of HTML pages has its own CSS file. CSS files should only contain information that is directly referenced by the associated HTML files.

10.5.3 Optimizing Content for Full Screen

Kindle books are read across a wide variety of devices (e.g., Fire tablets and other manufacturers' smartphones and tablets) and a wide variety of screen dimensions. The 2013 Kindle Fire HD 8.9" has a resolution of 1920 x 1200 pixels. Design the content to maintain this aspect ratio, if possible.

For the best user experience, Amazon strongly encourages publishers to design fixed-layout content to maximize the available space of the screen dimensions. If the content has a different aspect ratio or size, the Kindle devices and applications display it scaled to fit the screen, centered, and surrounded by a white margin (letterbox).

Fixed-layout and other image-heavy content is more likely to be magnified because customers prefer to read with Kindle Panel View or on devices with large screens. The best practice is to use the highest resolution images possible. Amazon recommends submitting images scaled to support *at least* 2X magnification with high quality. For example, if planning for the 2013 Kindle Fire HD 8.9", the image pixel dimensions should be at least 3840 x 2400 (this matches the aspect ratio and would support 2X zoom). Always use Kindle Previewer to validate the quality of the content.

10.5.4 Using Large Region Magnification Tap Targets in Fixed-Layout Books with Text Pop-Ups

The primary purpose of Region Magnification is to aid accessibility and is more effective when the tap target is larger than the area being magnified. To enable a larger area, consider adding a padding of 20 to 40 pixels to the `app-amzn-magnify` anchor elements, but do not let the tap targets overlap.

10.5.5 Using position:absolute for Text on Image

For text on an image that needs to be positioned exactly, use the `position: absolute` attribute. Only use this attribute for books that need a fixed layout, such as children's picture books with text specifically positioned in relation to background image elements.

10.5.6 Future-Proofing Fixed-Layout Content with Text Pop-Ups

By definition, fixed-layout is designed for a single screen size. To future-proof your content, Amazon recommends using pixels for text size and positioning text blocks. Specifying font size or text position in percentages can result in fractions of pixels which may be interpreted differently across devices.

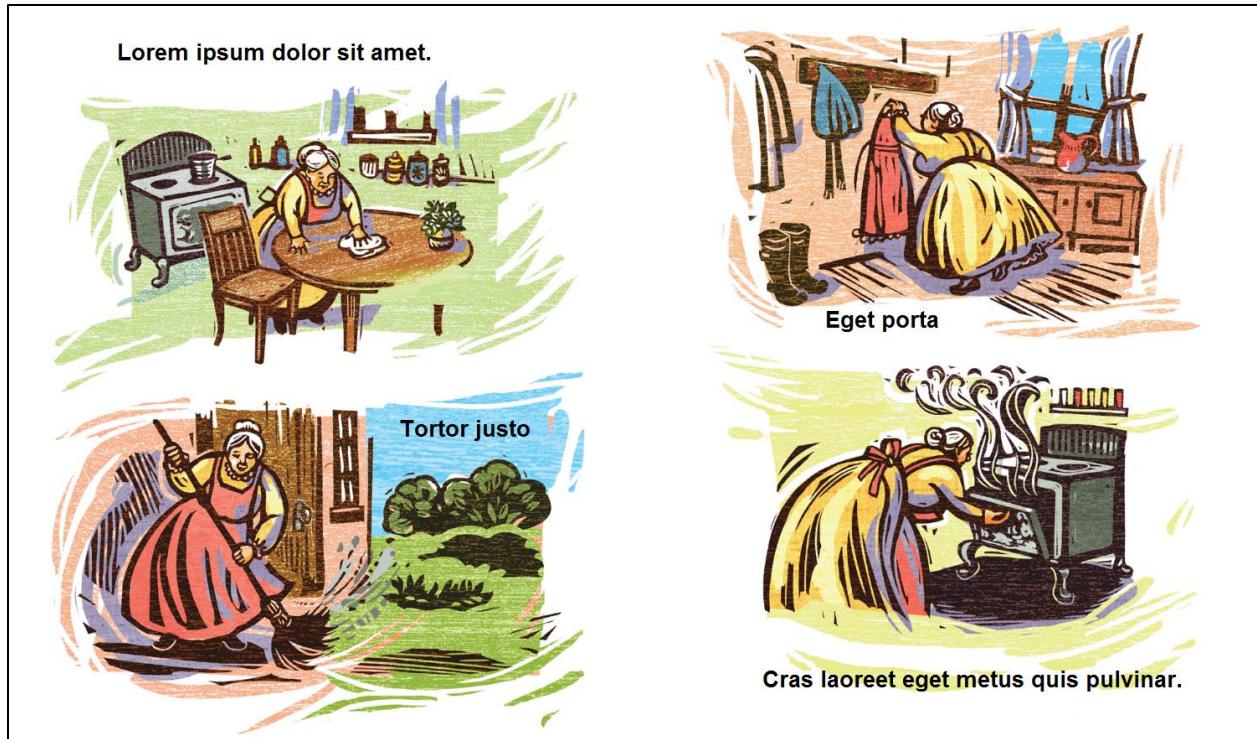
10.6 Creating Fixed-Layout Books with Text Pop-Ups with Multipage Background Images and Text

This section explains the proper way to create pages that contain a single background image and text. While there are many potential solutions, Amazon's goal is to ensure that markup is easily portable with minimal effort. The provided template meets this goal by updating the CSS rules without changing the HTML.

10.6.1 Using Side-by-Side Images When Orientation-Lock Is Set to Landscape

Many books have a landscape spread that consists of a single image. Other books have a landscape spread that consists of two side-by-side images stitched together.

In the example below, the landscape spread is 1024 x 600 pixels, which is full-screen resolution for the Kindle Fire (1st generation). The images for each page should have dimensions exactly half the width of the full screen: 512 x 600 pixels. The unique parts of each element are labeled using CSS IDs; the common parts use CSS classes. The left image displays on the left side of the spread. The right image is shifted to the right side of the page by defining a `margin-left` style set to the width of the left side image.



The end result is two pages stitched together to make a single image to be viewed in landscape mode. This differs from a synthetic spread, where one page is visible in portrait mode and two side-by-side pages are visible in landscape mode, which is unique to the comic book-type. Guidance on synthetic spreads can be found in section 11.4.1.

HTML:

```
<div class="fs">
<div id="fs9-img" class="lPage"></div>
<div id="fs10-img" class="rPage"></div>
</div>
```

CSS:

```
/* Region sized for both pages */
#fs9-img {
    background-image: url("../images/005a.jpg");
    background-size: 100% 100%;
}

#fs10-img {
    background-image: url("../images/005b.jpg");
    background-size: 100% 100%;
```

```
}

div.fs {
    height: 600px;
    width: 1024px; /* 2 x page width */
    position: relative;
}

div.lPage {
    position: absolute;
    background-repeat: no-repeat;
    height: 600px;
    width: 512px; /* 1 x screen width */
}

div.rPage {
    position: absolute;
    background-repeat: no-repeat;
    height: 600px;
    width: 512px; /* 1 x screen width /
    margin-left: 512px; /* this value equals the value of the left side image width */
}
```

10.6.2 Positioning Text Blocks

Specify the proper position and font size using percentages. This allows the position to scale consistently at different resolutions, ensuring compatibility across a wider range of devices and screens. Each paragraph should be grouped within a single `<div>` element, with multiple lines broken by `
` elements. If custom line spacing is required, assign this via CSS style declarations instead of adding extra markup such as multiple `<div>` containers or extra line break tags.

The example in section 10.4.2, Requirement #2: Using Region Magnification (Pop-Ups), expands on the two-page image example and illustrates how to place text on top of a background image: text is positioned within a fixed spread block, uses percentages for the margin attribute, and is aligned and spaced via CSS. Text pop-ups should be positioned so that they cover the corresponding text in the background.

10.6.3 Aligning Text

By default, text aligns to the upper left corner of the containing HTML element. Many books may have text that is right-aligned, bottom-aligned, or justified. The easiest way to identify the alignment is to imagine an outline around the text and identify which edges of the paragraph are associated with a margin (top, left, right, bottom).

Never use non-breaking space () characters for text alignment. Instead, use CSS top, right, bottom and left to position <div> elements that contain absolutely positioned text. Use two adjacent sides to position each <div> element. For example, top and left but never top, left, and bottom. CSS text-indent and line-height are useful in aligning text within HTML block elements.

11 Creating Fixed-Layout Books with Image Pop-Ups or Virtual Panels

Graphic novels, manga, and comics (hereafter referred to as graphic novels) are the most common fixed-layout books with image pop-ups or Virtual Panels. They are similar to children's books, but present a unique challenge because they tend to be longer and have more complex content.

Graphic novels include a large amount of detail in images that displays on a 1920 x 1200 screen. To overcome this and other accessibility concerns, Amazon encourages the use of customized content and our Kindle Panel View feature, which optimizes the content for a high-resolution reading experience. For more details on Kindle Comic Creator, see section 2.2.4.

Important: Nested anchor tags are not supported in fixed-layout books. Fixed-layout books with nested anchor tags will be suppressed.

11.1 Metadata Guidelines

The OPF file specifies metadata necessary for fixed-layout books. For a demonstration, see the graphic novel example at www.amazon.com/kindleformat (under the **KindleGen Examples** heading in the sidebar).

While similar, the various types of fixed-layout formats have key differences. Unless explicitly stated, guidance for fixed layout books with image pop-ups or Virtual Panels should not be applied to any other format, such as fixed-layout books with text pop-ups.

Metadata	Description
<p>Layout can be specified using one of the following metadata fields:</p> <ol style="list-style-type: none"> 1) <meta property="rendition:layout">pre-paginated</meta> 2) <meta name="fixed-layout" content="true"/> 	<p>Required. Identifies the book as having a fixed layout.</p> <p>Valid values for <code>rendition:layout</code> metadata are <code>reflowable</code> or <code>pre-paginated</code>. The default value is <code>reflowable</code>.</p> <p>Valid values for <code>fixed-layout</code> metadata are <code>true</code> or <code>false</code>. The default value is <code>false</code>.</p>
<meta name="original-resolution" content="1024x600"/>	Required. Identifies the original design resolution of the content ("1024x600" is only an example). The pixel dimensions can have any positive integer value. These values must be in proportion to the overall aspect ratio of the original content.

Metadata	Description
<p>Orientation can be specified using one of the following metadata fields:</p> <ol style="list-style-type: none"> 1) <meta property="rendition:orientation">landscape</meta> 2) <meta name="orientation-lock" content="landscape"/> <p>Note: This is not currently supported in iOS.</p>	<p>Optional (but recommended).</p> <p>Valid values for <code>rendition:orientation</code> metadata are <code>portrait</code>, <code>landscape</code>, or <code>auto</code>. Locks the orientation of the book to either portrait or landscape. If the value is <code>auto</code>, both portrait and landscape modes are supported. The default value is <code>auto</code>.</p> <p>Valid values for <code>orientation-lock</code> metadata are <code>portrait</code>, <code>landscape</code> or <code>none</code>. Locks the orientation of the content to either portrait or landscape. If the value is <code>none</code>, both portrait and landscape modes are supported. The default value is <code>none</code>.</p>
<pre><meta name="primary-writing-mode" content="horizontal-rl"/></pre>	<p>Required for Virtual Panels in manga with right-to-left reading order; optional for other fixed-layout books. Defines page rendering order, reading mode, and reader navigation (including Kindle Text Pop-Up, Kindle Panel View, and Kindle Virtual Panels). Valid values are <code>horizontal-lr</code>, <code>horizontal-rl</code>, <code>vertical-lr</code>, and <code>vertical-rl</code>. The default value is <code>horizontal-lr</code>.</p> <p>The default behavior is <code>horizontal-lr</code> when the page progression direction is left-to-right or not specified. Use the value <code>horizontal-rl</code> to set the page progression direction to right-to-left.</p> <p>Use the value <code>vertical-rl</code> to set a page progression direction of right-to-left for Chinese, Japanese, and Korean books.</p>

Metadata	Description
<itemref idref="page-id" properties="page-spread-left"/>	<p>Required for Virtual Panels in comics and manga; optional for other fixed-layout books. Allows publishers to specify page layouts (synthetic spreads) at the page level and can vary throughout the book. The page properties should be specified in the itemref elements (child of <spine> element in the OPF file).</p> <p>Valid values are page-spread-left, page-spread-right, page-spread-center, facing-page-left, facing-page-right, and layout-blank. The value layout-blank can be used independently or in conjunction with other valid values.</p> <p>The default value is page-spread-center.</p>
<meta name="book-type" content="comic"/>	<p>Required for all graphic novels; optional for other fixed-layout books. Removes reader functionality (e.g., share) which may not be relevant for certain books such as children's. Valid values are children or comic.</p>

11.2 Image Guidelines

When optimized for the 2013 Kindle Fire HD 8.9", graphic novels should maintain a 1920 x 1200 aspect ratio. The image resolution will differ depending on the zoom factor required for Kindle Panel View. However, Amazon recommends planning for a high quality reading experience at 2X magnification. Images must be in the JPEG format. Amazon recommends using an image resolution of at least 300 ppi.

There are five standard zoom factors:

Zoom Factor	When to Use	Required Image Resolution
100%	Avoid using this zoom factor. It offers no magnification and poses an accessibility challenge for users.	1920 x 1200 pixels
125%	Only use this zoom factor when it is absolutely necessary to enlarge a very large panel. This allows the user to see a large action scene, but with the downside of limited enlargement.	2400 x 1500 pixels

Zoom Factor	When to Use	Required Image Resolution
150%	This is the default and preferred zoom factor. Use this zoom factor whenever possible.	2880 x 1800 pixels
200%	Use this zoom factor for small text.	3840 x 2400 pixels
250%	Only use this zoom factor when two physical pages are stitched together in the HTML file and displayed at once and content appears especially small as a result. The downside is that the enlarged panel only represents a small portion of the original page.	4800 x 3000 pixels

Image quality for graphic novels requires that images follow the resolution standards listed in this section and maintain a consistent aspect ratio. Most importantly, optimize images for clarity of background art as well as readability of text. These two factors guarantee the highest quality for the graphic novel format.

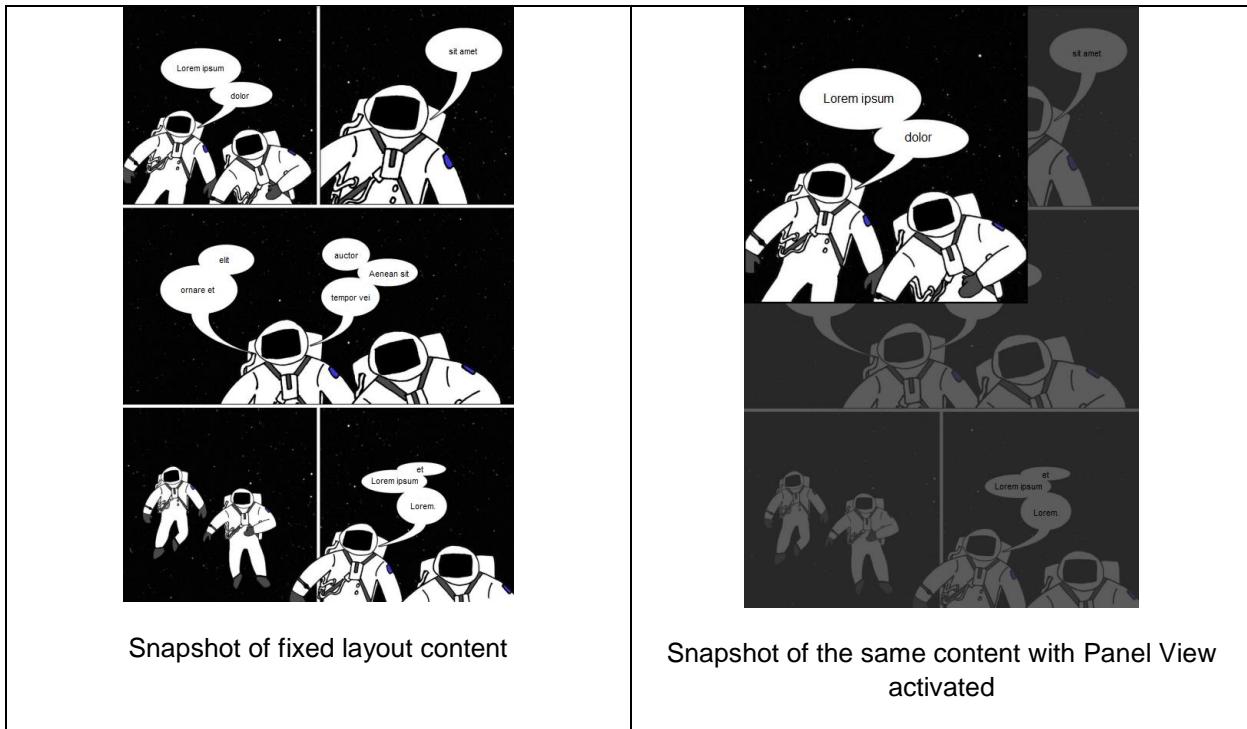
11.3 Panel View (Region Magnification)

Panel View for graphic novels offers a unique reading experience. It addresses accessibility and lets users experience the flow of action on each page in a high-resolution, easy-to-use manner. Users can dismiss Panel View at any time to view the entire page. For an example of Panel View, see the images in this section.

The user activates Panel View by double tapping a “tap target”. The active area (source element) is hidden and the Panel View (target element) is displayed.

To support Panel View, the following steps are required:

1. Set the tap target by creating a well-defined container (`<div>`) element that contains an anchor (`<a>`) element. The `<div>` provides the size and position of the tap target. The `<a>` is sized to fill the `<div>` and must specify the `app-amzn-magnify` class. The anchor should also have the following attributes stored in a JSON object as part of the `data-app-amzn-magnify` value:
 - a. `"targetId":<string:elementId>` = unique element id of the Panel View HTML element that represents the enlarged region
 - b. `"ordinal":<integer:reading order>` = reading order of the magnification areas (the order in which panels appear as part of the reading flow)
2. Create a target view panel `<div>` element that is sized and positioned to display the action that best reflects the tap target.



Example:

```
<div>



</div>

<div id="page_002-1">

<a class="app-amzn-magnify" data-app-amzn-magnify='{"targetId":"page_002-1-magTargetParent", "ordinal":1}'></a>

</div>

...

<div id="page_002-1-magTargetParent" class="target-mag-parent">

<div class="target-mag-lb">

</div>

<div id="page_002-1-magTarget" class="target-mag">



</div>

</div>
```

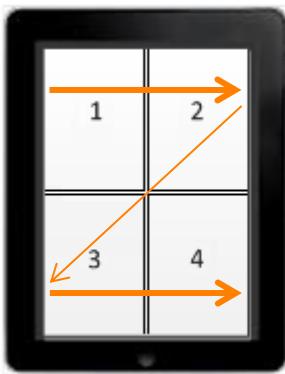
11.4 Virtual Panels in Comics and Manga

The Virtual Panels feature is activated for comics and manga books in the absence of publisher-provided panels. The `RegionMagnification` metadata is used to identify whether the publisher has provided panel information. If the publisher has included Region Magnification panels on any page, the Kindle Virtual Panel view is not enabled.

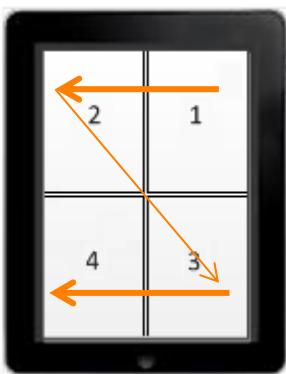
By default, every page is divided into four panels based on the `primary-writing-mode` value. The examples below indicate the order of the panels.

Example:

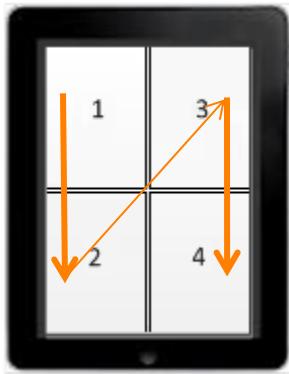
Portrait mode:



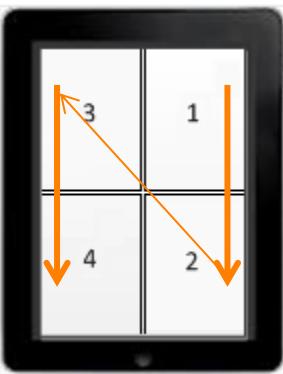
Horizontal-lr



Horizontal-rl

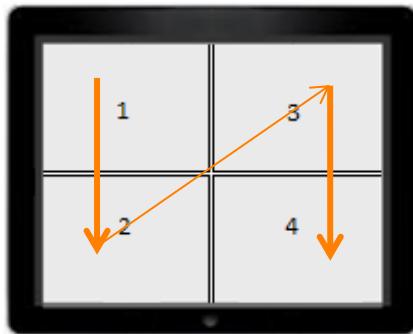


Vertical-rl

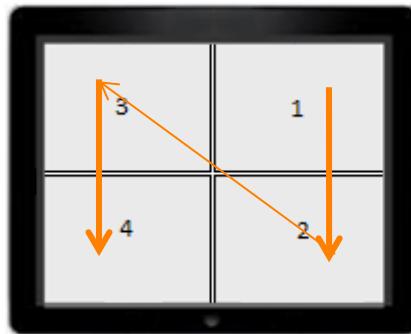


Vertical-lr

Landscape mode:

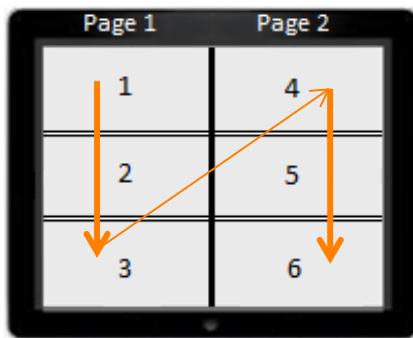


Vertical-Ir and Horizontal-Ir

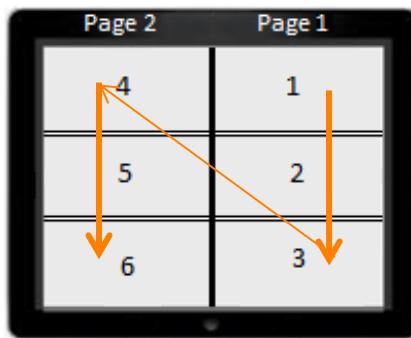


Horizontal-rl and Vertical-rl

Some devices accommodate synthetic spreads:



Vertical-Ir and Horizontal-Ir

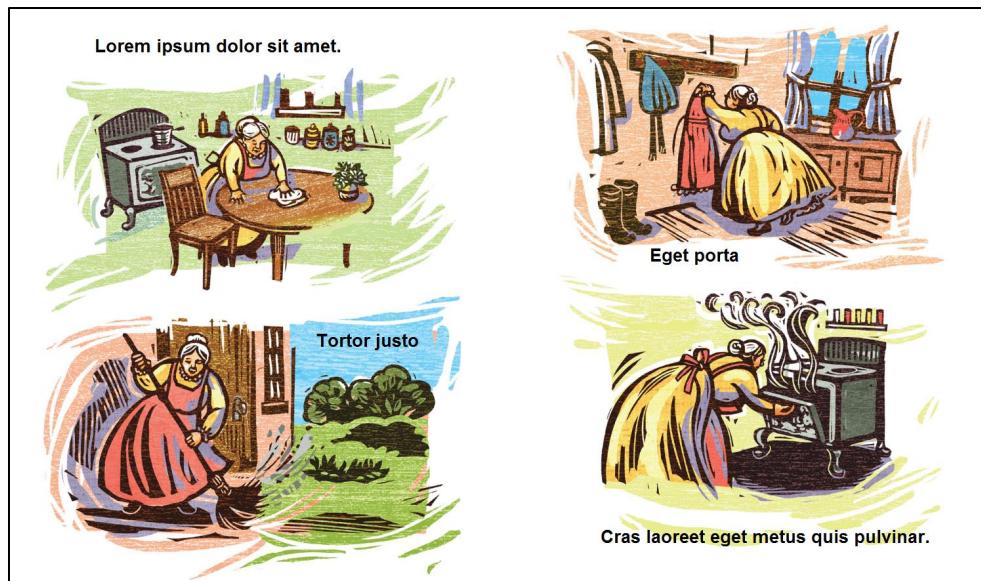


Horizontal-rl and Vertical-rl

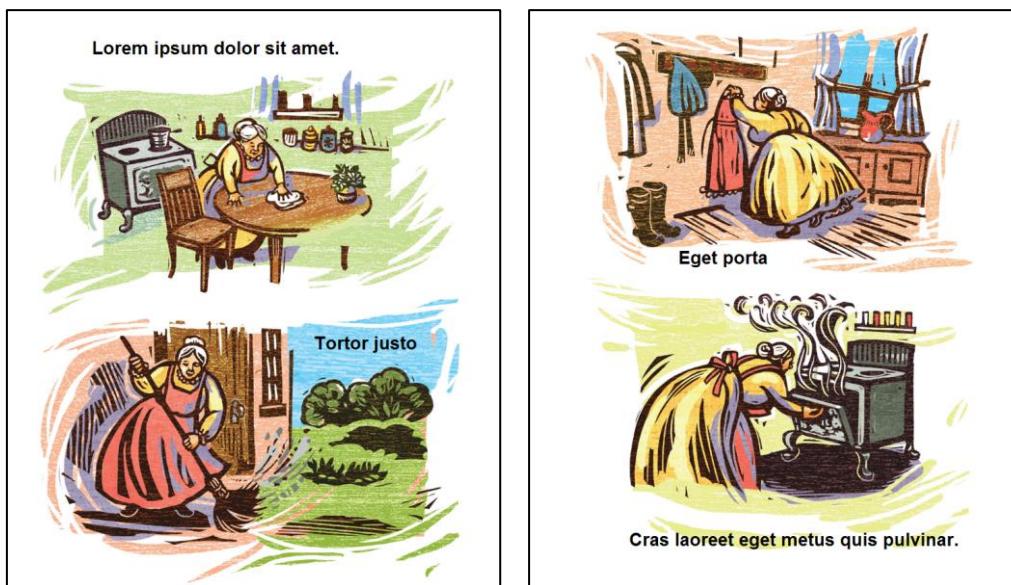
11.4.1 Requirement #1: Using a Synthetic Spread When Orientation-Lock Equals None

If orientation is not locked, content should be designed for both portrait and landscape mode. Some devices show a synthetic spread with two pages side-by-side in landscape mode. Every page intended to be used in a synthetic spread is expected to have a defined paired page in landscape orientation. In portrait orientation, the pairs are ignored.

Pages to be used in synthetic spreads should be tagged with the properties `page-spread-left` or `page-spread-right`. Every left page should have a right page associated and vice-versa. Single pages can be centered on the device in landscape mode by using the property `page-spread-center`.



In portrait mode, the two pages will be rendered separately as shown below:



If none of the properties are specified or if a page is tagged `page-spread-left` without a matching `page-spread-right` (or vice-versa), Kindle assumes `page-spread-center` and centers pages with no `page-spread` property when the device is in landscape mode.

The following example assumes `primary-writing-mode` equals `horizontal-lr` or `vertical-lr`.

Example:

```
<spine>
<itemref idref="page1" /> <!--NOTE: assumed to be properties="page-spread-center" -->
```

```
<itemref idref="page2" /> <!-- NOTE: assumed to be properties="page-spread-center" -->
<itemref idref="page3" properties="page-spread-left"/> <!-- NOTE: synthetic spread's
left viewport -->
<itemref idref="page4" properties="page-spread-right"/> <!-- NOTE: synthetic spread's;
right viewport -->
</spine>
```

The following example assumes primary-writing-mode equals horizontal-rl or vertical-rl.

Example:

```
<spine>
<itemref idref="page1" /> <!-- NOTE: assumed to be properties="facing-page-right" -->
<itemref idref="page2" /> <!-- NOTE: assumed to be properties="facing-page-left" -->
<itemref idref="page3" properties="page-spread-right"/> <!-- NOTE: synthetic spread's
right viewport -->
<itemref idref="page4" properties="page-spread-left"/> <!-- NOTE: synthetic spread's
left viewport -->
</spine>
```

In cases where a left page does not have an equivalent right page (or vice-versa), the publisher may insert a blank HTML page and add the property layout-blank to the page, unless it is the last page. Optionally, the blank page can include the book title and watermark by design.

Pages with the layout-blank property are only rendered in landscape mode and are ignored in portrait mode.

In some cases, the publisher may wish to insert a blank page that always renders in both portrait and landscape modes. In this instance, do not use the layout-blank property. Use the same synthetic spread rules as noted above and reference an image file that contains a "blank" JPEG.

The following example assumes primary-writing-mode equals horizontal-lr or vertical-lr.

Example:

```
<spine>
<itemref idref="page1" /> <!-- NOTE: assumed to be properties="page-spread-left" -->
<itemref idref="blank-page" properties="layout-blank"/> <!-- NOTE: assumed to be
properties="page-spread-right". Ignored in portrait mode. -->
<itemref idref="page2" properties="page-spread-left"/> <!-- NOTE: synthetic spread's
left viewport -->
<itemref idref="page3" properties="page-spread-right"/> <!-- NOTE: synthetic spread's
right viewport -->
```

```
</spine>
```

11.5 Optimizing Content for the Graphic Novel Experience

11.5.1 Optimizing Tap Targets

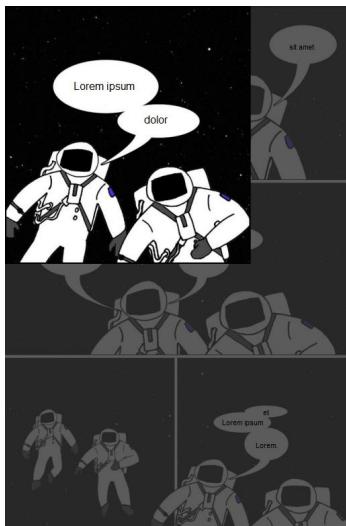
Tap targets should effectively cover 100% of the screen. This ensures that the user gets a magnified experience whenever the user double taps the graphic novel.

11.5.2 Optimizing View Panels

View panels should be 150% of the tap target by default. It is acceptable to use different size view panels to emphasize a specific action scene within the tap target.

Position view panels so that they cover the corresponding image in the background. They should be positioned over base panels and aligned to margins where possible.

When preserving context across multiple panels, it is acceptable to overlap slightly with other view panels.



To use the default 150% default zoom factor, an action scene often needs to be divided into two view panels (typically a left and right or top and bottom). This is a better user experience than using a smaller zoom factor, because it preserves accessibility and gives the user a higher resolution reading experience.

Split the tap targets so that the first tap target is between 50 and 75% of the width of the entire area, and the second tap target is the remaining amount necessary to reach 100%. This ensures that when a user double taps an area near the middle of the action panel, they experience the first view panel first, and then the second view panel when they move forward.

To preserve the flow of the action, view panels should display a small amount of overlapped action.



First view panel of an action scene divided into two view panels

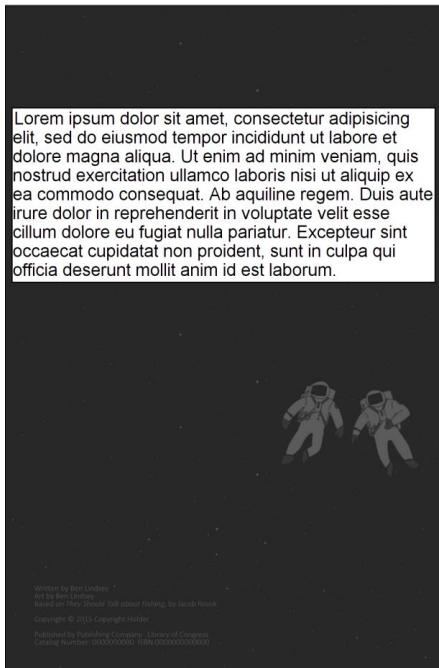


Second view panel of an action scene divided into two view panels

11.6 Text Guidelines

To display large amounts of text, Amazon suggests a hybrid text treatment that mixes the experiences of the graphic novels and children's books. Amazon recommends limiting the use of the hybrid text treatment to sections of text that are too wide to be magnified effectively. The hybrid text treatment should mimic the formatting of the text it represents in line-height, italic and/or boldface, and general appearance. This provides a better user experience.

To future-proof your content, Amazon recommends using pixels for text size and positioning text blocks. Specifying font size or text position in percentages can result in fractions of pixels which may be interpreted differently across devices.



Hybrid Text HTML Example:

```
<div id="Title_page-2-magTargetParent" class="target-mag-parent">
<div class="target-mag-lb"></div>
<div id="Title_page-2-magTarget" class="target-mag" amzn-ke-id-rtbar="amzn-ke-id-rtbar">
<div class="target-mag-text" id="amzn-ke-id-rtbar-Title_page-2-magTarget">
<span id="amzn-ke-id-rtbar-Title_page-2-magTarget-2"></span>
<span class="" id="amzn-ke-id-rtbar-Title_page-2-magTarget-3">Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Ab aquiline regem. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</span>
```

Hybrid Text CSS Example:

```
div.target-mag div.text{
    height: 100%;
    padding: 5px;
    background-color: #000000;
    font-size: 150%;
    font-family: "Arial";
```

}

11.7 Guided View

11.7.1 About Guided View

Guided View is a series of enhancements to the comic eBook reading experience that are now available for some Kindle comics. These enhancements allow readers to view a comic on a panel by panel basis suitable for mobile devices in a way that mimics the natural motion of the user's eye through the comic. Guided View animates panel to panel movement with each swipe to give a clear indication of how the story progresses across each page. Guided View features include:

- A guided panel by panel reading experience using the panel order set by the publisher
- Panels magnified to full-screen size and centered
- Custom masking colors around each panel when magnified

The Guided View reading experience has been developed by Comixology. A visual introduction to the Guided View experience can be viewed here:

<https://support.comixology.com/customer/portal/articles/768035-what-is-comixology-s-guided-view%2E2%84%A2-technology->

Guided View is automatically applied to compatible Kindle Comics and uses the existing Panel View code to properly position panels in Guided View. Amazon is continuously working to make Guided View compatible with more titles and will automatically enable Guided View enhancements for your Kindle comic when possible.

12 Creating Fixed-Layout Books Without Pop-Ups

In cases where a fixed layout is needed to maintain the layout of the original book, but where text selection, dictionary, and highlighting are still required, fixed-layout without pop-ups may be used. This conversion technique is ideal for content that has text large enough to be easily read without magnification, which can also be accomplished by redesigning the eBook to optimize for digital reading (on a 7" tablet device, capital letters in body text must be at least 2mm high in non-children's books and at least 4mm high in children's books).

The HTML and CSS of this format follows the specifications of section 10, Creating Fixed-Layout Books with Text Pop-Ups, including the CSS reset and embedded fonts. Fonts must be embedded, as is the standard for all fixed-layout books.

12.1 Metadata Guidelines

The OPF file specifies metadata necessary for fixed-layout books. Unlike other fixed-layout books, this format does not include `meta name="book-type"` or `meta name="RegionMagnification"`.

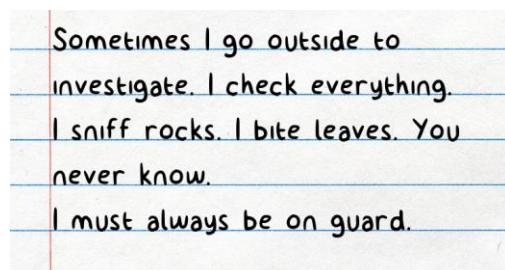
Metadata	Description
<p>Layout can be specified using one of the following metadata fields:</p> <p>1) <meta property="rendition:layout">pre-paginated</meta></p> <p>2) <meta name="fixed-layout" content="true"/></p>	<p>Required. Identifies the book as having a fixed layout.</p> <p>Valid values for <code>rendition:layout</code> metadata are <code>reflowable</code> or <code>pre-paginated</code>. The default value is <code>reflowable</code>.</p> <p>Valid values for <code>fixed-layout</code> metadata are <code>true</code> or <code>false</code>. The default value is <code>false</code>.</p>
<p><meta name="original-resolution" content="1024x600"/></p>	<p>Required. Identifies the original design resolution of the content ("1024x600" is only an example). The pixel dimensions can have any positive integer value. These values must be in proportion to the overall aspect ratio of the original content.</p>
<p>Orientation can be specified using one of the following metadata fields:</p> <p>1) <meta property="rendition:orientation">landscape</meta></p> <p>2) <meta name="orientation-lock" content="landscape"/></p>	<p>Optional.</p> <p>Valid values for <code>rendition:orientation</code> metadata are <code>portrait</code>, <code>landscape</code>, or <code>auto</code>. Locks the orientation of the book to either portrait or landscape. If the value is <code>auto</code>, both portrait and landscape modes are supported. The default value is <code>auto</code>.</p> <p>Valid values for <code>orientation-lock</code> metadata are <code>portrait</code>, <code>landscape</code> or <code>none</code>. Locks the orientation of the content to either portrait or landscape. If the value is <code>none</code>, both portrait and landscape modes are supported. The default value is <code>none</code>.</p> <p>Amazon recommends only unlocking orientation when text is readable in both portrait and landscape.</p>
<p><meta name="primary-writing-mode" content="horizontal-rl"/></p>	<p>Optional. Defines page rendering order, reading mode, and reader navigation (including Kindle Text Pop-Up, Kindle Panel View, and Kindle Virtual Panels). Valid values are <code>horizontal-lr</code>, <code>horizontal-rl</code>, <code>vertical-lr</code>, and <code>vertical-rl</code>. The default value is <code>horizontal-lr</code>.</p>

12.2 Text Guidelines

In this format, each page contains a background image that is larger than the screen size, so that the page renders a high-quality, readable image. The text can then be created with either of the two following methods and both methods can be used in the same book. With either method, capital letters in body text must be at least 2mm high in non-children's content and 4mm high in children's content on a 7" tablet device.

Live HTML Text

In this method, the background image is stripped of text and the majority of text in the book is rendered as live HTML text. The text can be repositioned as needed for a good eBook experience. This method also allows search and dictionary functionality.



HTML:

```
<div class="page" id="p3">
    <div class="pimg" id="img_003"/>
        <p id="p3_2" class="ptxt">Sometimes I go outside
            <br />to investigate. I check everything.
            <br/>I sniff rocks. I bite leaves. You
            <br />never know.
            <br/>I must always be on guard.<br/></p>
    </div>
</div>
```

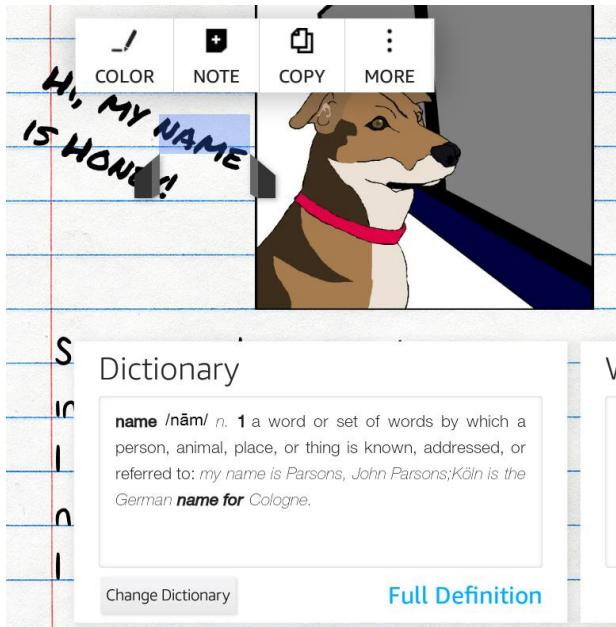
CSS:

```
.ptxt{
    font-family: "billy";
    font-size: 450%;
    line-height: 95%;
    position: absolute;
    top: 0%;
```

```
left: 2.35%; }
```

Invisible Text Overlay

For text that is part of an image, or is irregularly sized, angled, or curved, you can capture that text as part of the background and use invisible overlay text (using the `opacity: 0` property in the CSS file) to enable selection, dictionary lookup, and search. The invisible overlay text should be positioned directly over the corresponding text in the base image, and should be sized so that the highlight area of the invisible text corresponds to the text in the base image.



HTML:

```
<div class="page" id="p3">

<div class="overlay" id="o3_1">Hi,</div>
<div class="overlay" id="o3_2">my</div>
<div class="overlay" id="o3_3">name</div>
<div class="overlay" id="o3_4">is</div>
<div class="overlay" id="o3_5">Honey!</div>
</div>
```

Due to the angled text, every word must be positioned individually so that the invisible HTML text overlays the correct word.

CSS:

```
.overlay{
```

```

position: absolute;
font-family: "billy";
opacity: 0;
color: red;
font-size: 500%;
line-height: 107%;
text-align: center;
}

...
#o3_1{top: 39.5%; left: 6.7%; font-size: 450%; }
#o3_2{top: 41.5%; left: 15.5%; font-size: 450%; }
#o3_3{top: 44.2%; left: 24.5%; font-size: 500%; }
#o3_4{top: 44.1%; left: 4.2%; font-size: 450%; }
#o3_5{top: 46.6%; left: 9.9%; font-size: 500%; }

```

13 Creating Kindle Edition with Audio/Video Content

Currently, Kindle Edition with Audio/Video content is available on Fire tablets (2nd generation and later), iPad, iPhone, and iPod Touch. Audio and video content is not supported on Kindle E-reader devices (customers can read the book, but any audio or video is replaced with a message that it is not supported on this device).

KF8 features are not currently supported in Kindle Edition with Audio/Video content (see sections 13.5 and 13.6 for details). The file delivered to Amazon should be a Mobi 7 EPUB with self-contained audio and video or a Mobi 7 .prc file with self-contained audio and video. Publishers should use the latest version of KindleGen to create a .prc file. KindleGen is available at www.amazon.com/kindleformat.

Amazon's Kindle Direct Publishing Platform (KDP) does not currently accept Kindle Edition with Audio/Video content.

Amazon does not currently accept any audio or video books with embedded audio that acts as read-along content, which is defined as someone reading the full text or multiple pages of text from the book in either audio or video format.

When testing Kindle Edition with Audio/Video content, the audio and video cannot be previewed on Kindle Previewer or on Kindle devices and applications. To add audio and/or video content to your Kindle book, follow the guidelines and examples below.

13.1 Audio Requirements

Amazon recommends using stereo channels in the MP3 source where possible, because Kindle supports playing back audio in stereo. Use as high a bit rate as you need to hear the audio content appropriately;

this is a judgment call. For good results, consider bit rates between 128 kbps and 256 kbps (kilobits per second). The maximum supported by Kindle is 320 kbps at variable bit rate.

13.2 Video Requirements

Since audio content can be part of the video content, Amazon recommends using stereo channels in your audio source where possible. Kindle supports playing back audio in stereo.

This is the **ideal** source spec:

Attribute	Setting
Dimensions	Widescreen: 704 x 396 (or any other widescreen ratio); Fullscreen: 640 x 480
Interlacing	Progressive
Color Space	4:2:0 YUV
Video Codec	H.264 (recommended), MPEG-2
Video Mode	VBR (recommended) or CBR
Video Bit Rate	2500 kbps or higher recommended
Key Frame Interval	2 or 4 seconds recommended
Audio Codec	MP3
Audio Bit Rate	256 kbps or higher recommended
Audio Sample Rate	48 kHz (recommended), 44.1 kHz

The following container formats are acceptable:

Container	File Extensions	Mime Type	RFC
MP4	.mp4	video/h264	RFC3984
MPEG-2 video file	.mpg, .mpeg	video/mpeg	RFC2045, RFC2046
MPEG-2 program stream	.ps	video/mp2p	RFC3555

Container	File Extensions	Mime Type	RFC
MPEG-2 transport stream	.ts	video/mp2t	RFC3555

Will not work: any other video codec (such as Windows Media, Apple ProRes), AC3 audio, audio >2 channels

13.3 File Requirements

13.3.1 Multimedia Directory

When adding audio and video files to an eBook, create an “audiovideo” directory for storing these files. When referring to the audio or video file, include the directory name (**Example:** “audiovideo/filename”) in the HTML.

13.3.2 Confirm Correct Mime-Type

When specifying video and audio files in the OPF, make sure that they have the correct mime-types, depending on the extensions used. (**Example:** MP4 video files should have a mime-type of “video/mp4” and not “audio/mpeg”.)

13.3.3 File Size

Limit the combined file sizes of all audio and video files to 600 MB or less for each title. If the files are larger than 600 MB, manually transcode them to reduce the file size(s).

Limit the number of individual audio and video files within each title to 1,000 or fewer.

13.4 Navigation Guidelines

13.4.1 Including an Audio and Video TOC

All Kindle Edition with Audio/Video content must have a TOC that begins with "List of Audio and Video." This line should be bold. On the next line, begin an indented list of hyperlinks to each audio and video file. The text of the link should include the file description, with the file duration in parentheses.

Use these guidelines for all audio and video files longer than 10 seconds that a user might want to see listed. For general navigation and TOC guidance, see section 5.

Here is an example of how the code below would display in the TOC:

List of Audio and Video

This is my video (5:01)

This is my audio (1:10)

This is the corresponding code for the example above:

```
<video id="video_1" src=" audiovideo//movie.mp4" controls poster="start.jpg"
title="This is my video (5:01)">
<br/><br/><br/>"There is video content at this location that is not currently supported for your device. The caption
for this content is displayed below."<br/><br/><br/>
```

```

</video>

<br>This is my video (5:01)</br>

<audio id="audio_1" src=" audiovideo//audio.mp3" controls title="This is my audio (1:10)">

<br/><br/><br/>"There is audio content at this location that is not currently supported for your device. The caption for this content is displayed below." <br/><br/><br/>

</audio>

<strong>This is my audio (1:10)</strong>

```

13.4.2 Including Audio and Video Assets in NCX File

When creating eBooks with audio and video content, Amazon recommends the creation of an NCX file that points to the audio and video assets. This file should list all video and audio files in reading order, with links to where they occur in the book. For descriptions of the audio and video files, reuse the same audio and video metadata. (**Example:** A link to the video clip in section 13.7.3 would say “How to create Kindle content (5:01).”) This information should be embedded in the NavList portion of the NCX file.

13.5 Text Guidelines

KF8 features are not currently supported in Kindle Edition with Audio/Video content. This includes, but is not limited to:

- Borders
- Drop caps
- Drop shadow
- Embedded fonts
- Floating elements
- Nested tables and merged cells

13.6 Image Guidelines

KF8 features are not currently supported in Kindle Edition with Audio/Video content. This includes, but is not limited to:

- Background images
- Floating images
- Scalable Vector Graphics (SVG)

13.7 Audio and Video Guidelines

13.7.1 Adding Audio

Streaming audio is not supported at this time. Use embedded audio instead.

To embed an audio file inside a Kindle book, add a standard HTML 5 tag such as the following:

Example:

```
<audio id="audio_1" src="audio.mp3" controls title="Audio about ...">
```

```
<br/><br/><br/>"There is audio content at this location that is not currently supported for your device. The caption for this content is displayed below."<br/><br/><br/>
```

```
</audio>
```

- **src tag:** (Required) Identifies the embedded audio file, which must be in MP3 format.
- **title tag:** (Optional) Identifies the description of the audio.
- **controls tag:** (Required, unless you provide an image for use in starting the video playback) Tells the Kindle application to display controls for the embedded audio.
- **text content:** (Required) Devices that do not support audio content display the text between the `<audio>` and `</audio>` tags. If users view this eBook on a device that does not support audio, they see this text instead. (**Example:** “There is content at this location that is not currently supported for your device. The caption for this content is displayed below.”)
- **id tag:** (Optional) Must be unique to the document if it is used.

13.7.2 Adding Video

Streaming video is not supported at this time. Use embedded video instead.

To embed a video inside a Kindle book, add a standard HTML 5 tag such as the following:

Example:

```
<video id="video_1" src="movie.mp4" controls poster="start.jpg" title="Video about ...">

<br/><br/><br/>"There is video content at this location that is not currently supported for your device. The caption for this content is displayed below."<br/><br/><br/>

</video>
```

- **src tag:** (Required) Identifies the embedded video file.
- **title tag:** (Required) Identifies the description of the video.
- **poster tag:** (Required) Identifies the placeholder image file. Users see the placeholder in the eBook before the video is played. The placeholder could be the first frame of the video or a representative frame, depending on your preference. (If this file is not specified, a blank black image is displayed.)
- **controls tag:** (Required, unless you provide an image for use in starting the video playback) Tells the Kindle application to display controls for the embedded video.

Note: The Kindle application may render a play button on top of the poster frame. It appears in the middle of the frame.

- **text content:** (Required) Devices that do not support video content display the text between the `<video>` and `</video>` tags. If users view this eBook on a device that does not support video, they see this text instead. (**Example:** “There is content at this location that is not currently supported for your device. The caption for this content is displayed below.”)
- **id tag:** (Optional) Must be unique to the document if it is used.

13.7.3 Audio and Video Metadata Required

Amazon recommends that publishers (or their conversion houses) provide a description of the audio and video file and the duration of the file in minutes and seconds in the HTML immediately after the audio and video file is specified.

Example:

```
<p align="center" style="text-indent:0px">

<video id="video_1" src="movie.mp4" controls poster="start.jpg" title="How to create Kindle content (5:01)">

<br/><br/><br/>"There is video content at this location that is not currently supported for your device. The caption for this content is displayed below."<br/><br/><br/>

</video>

<strong>How to create Kindle content (5:01)</strong>

</p>
```

13.7.4 Providing Descriptive Media Captions

Media captions describe the audio and video files to the user. Here are some general guidelines:

- Captions should not be generic. They should describe the media content they are referencing.
These media captions are not a good user experience:
 1. Media 1
 2. Track 1
 3. Audio 1
 4. Video 1

These media captions describe the content:

1. Introduction by the Author
 2. The Making of the Movie
- Media captions cannot include file extensions (.mp3, .mp4, etc.).

13.7.5 Adding Images with Play Controls

It is possible to tag images so that they can be played by clicking on them. The minimum pixel width and height for such images is 45 pixels by 45 pixels.

To add play controls to the image, superimpose the Amazon PLAY icon onto the lower right-hand side of any image via Adobe Photoshop or similar program. Then add the following tag to the HTML (in this example, the audio file has an `id` attribute of "audio1" and no `controls` tag):

Example:

```
<a onclick="play(this);" data-AmznAudioTag="audio1"></a>
```

13.8 Custom Sample File Required

Amazon requires that publishers create and supply a custom sample for each Kindle Edition with Audio/Video. The sample file should include a full TOC and an audio/video list, with live links to only the content in the sample file.

The sample file should include at least one of each type of media available in the full file, including both audio and video, if applicable.

The sample file must have a “Buy It Now” link added to the end, or where appropriate.

14 Creating Dictionaries

A dictionary is a Kindle eBook (.mobi file) with extra tags added to support search and lookup functionality. Dictionary eBooks:

- Contain a primary index: a list of words or sentences that are sorted in alphabetical order. Readers can search quickly in this list by typing the beginning of the word and selecting the desired entry.
- Are marked as dictionaries. The input and output languages of the dictionary must be defined properly so that Kindle devices can use the dictionary for in-book lookup.

For example, an English (monolingual) dictionary lists English as both the input and output language. A French-English dictionary lists French as the input language and English as the output language. To build a bidirectional bilingual dictionary (example: Spanish-French and French-Spanish), you must create two separate eBooks: one for Spanish-French and one for French-Spanish.

A Kindle dictionary should have all the same components as a normal Kindle eBook. There should be an OPF file and HTML files with CSS. Every dictionary should have:

- A cover image
- A copyright page
- Any relevant front or back matter (explanations of symbols, appendices, etc.)
- Definitions of words (this is the bulk of the file)

14.1 Metadata Guidelines

The OPF file of a dictionary is similar to that of other Kindle books, except that it contains specialized metadata tags in the `<x-metadata>` section. These extra tags in the OPF file set the source language and the target language for the dictionary. If the dictionary has multiple indices, the OPF file also specifies the name of the primary lookup index.

- The `<DictionaryInLanguage>` element contains the ISO 639-1 language code for the language of the books this dictionary is designed to be used on. For a Spanish-French dictionary, the input language is Spanish.
- The `<DictionaryOutLanguage>` element contains the ISO 639-1 language code for the language of the definitions returned by the dictionary. For a Spanish-French dictionary, the output language is French.
- The `<DefaultLookupIndex>` element indicates the index that will open first when the dictionary is used for lookup from another eBook. The default index must be specified if the dictionary has more than one index. The index name that is wrapped in the `<DefaultLookupIndex>` tags in the OPF file also should appear as the value of the `name` attribute in the `<idx:entry>` elements in the content of the dictionary (see section 14.3.3).

As an example, for a Spanish-French dictionary, the input language code would be `es`; the output language code would be `fr`, and the primary index might be named `spanish`. A list of country codes can be found at: http://www.w3schools.com/tags/ref_language_codes.asp.

Example: (Bilingual Dictionary Metadata)

```
<x-metadata>

<DictionaryInLanguage>es</DictionaryInLanguage>

<DictionaryOutLanguage>fr</DictionaryOutLanguage>

<DefaultLookupIndex>Spanish</DefaultLookupIndex>

...

</x-metadata>
```

For a monolingual dictionary, the same language code must appear twice: once to identify the input language, and again to identify the same language as the output language. To identify a regional variant for the source and/or target languages, a regional suffix may be appended to the ISO 639-1 code. For example, `en-gb` indicates British English, while `en-us` indicates US English.

Example: (Monolingual Dictionary Metadata, Regional Variant)

```
<x-metadata>

<DictionaryInLanguage>en-us</DictionaryInLanguage>

<DictionaryOutLanguage>en-us</DictionaryOutLanguage>

<DefaultLookupIndex>headword</DefaultLookupIndex>

...

</x-metadata>
```

14.2 Text Guidelines – Dictionary Entry Template

A simple, clean format works best for in-book lookup. Amazon recommends these dictionary content and formatting features for a high-quality user experience:

- The headword (word being defined) should come first in the entry, and should be distinguished from surrounding content (on its own line, flush left, in bold).
- Every dictionary entry should contain a definition (or translation, for bilingual dictionaries).
- Horizontal rules should appear between each entry.
- Each alphabet letter section should begin on a new page.
- Images should be avoided (see section 9.4 for image constraints).
- Tables should not be used (see section 9.5 for table constraints).
- Font color, size, and typeface should not be forced (see section 9.3 for text guidelines).

14.3 Basic Dictionary HTML

14.3.1 Format

Dictionaries for Kindle must be in Mobi 7 format, not in KF8. For this reason, the dictionary layout should use a single-column format. Multiple columns and sidebars are not supported in Mobi 7 format.

14.3.2 Frameset Element

All dictionaries must have an `<mbp:frameset>` element as the first child of the `<body>` element. This frameset element contains all of the `<idx:entry>` elements of the dictionary.

The namespace for this `<mbp:frameset>` element is

`xmlns:mbp="https://kindlegen.s3.amazonaws.com/AmazonKindlePublishingGuidelines.pdf"` and it must be declared in the root `<html>` element of the XHTML document.

Example:

```

<html xmlns:math="http://exslt.org/math" xmlns:svg="http://www.w3.org/2000/svg"
      xmlns:tl="https://kindlegen.s3.amazonaws.com/AmazonKindlePublishingGuidelines.pdf"

      xmlns:saxon="http://saxon.sf.net/" xmlns:xs="http://www.w3.org/2001/XMLSchema"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

      xmlns:cx="https://kindlegen.s3.amazonaws.com/AmazonKindlePublishingGuidelines.pdf"
      xmlns:dc="http://purl.org/dc/elements/1.1/"

      xmlns:mbp="https://kindlegen.s3.amazonaws.com/AmazonKindlePublishingGuidelines.pdf"
      xmlns:mmc="https://kindlegen.s3.amazonaws.com/AmazonKindlePublishingGuidelines.pdf"
      xmlns:idx="https://kindlegen.s3.amazonaws.com/AmazonKindlePublishingGuidelines.pdf">

  <head><meta http-equiv="Content-Type" content="text/html; charset=utf-8"></head>

  <body>

    <mbp:frameset>

      <idx:entry name="english" scriptable="yes" spell="yes">

        <idx:short><a id="1"></a>

          <idx:orth value="aardvark"><b>aard•vark</b>
          <idx:infl>
            <idx:iform value="aardvarks"></idx:iform>
            <idx:iform value="aardvark's"></idx:iform>
            <idx:iform value="aardvarks'"></idx:iform>
          </idx:infl>
        </idx:orth>
        <p> A nocturnal burrowing mammal native to sub-Saharan Africa that feeds exclusively on ants and termites. </p>
      </idx:short>
    </body>
  </html>

```

```
</idx:entry>
[...other entries...]
</mbp:frameset>
</body>
</html>
```

14.3.3 Headword Index

In order to make an alphabetical index of headwords, it is necessary to use special tags that are not standard HTML. The source still will be valid XHTML with these added `<idx>` mark-ups.

<idx:entry>..</idx:entry>

The `<idx:entry>` tag marks the scope of each entry to be indexed. In a dictionary, each headword with its definition(s) should be placed between `<idx:entry>` and `</idx:entry>`. Any type of HTML may be placed within this tag.

The `<idx:entry>` tag can carry the `name`, `scriptable`, and `spell` attributes. The `name` attribute indicates the index to which the headword belongs. The value of the `name` attribute should be the same as the default lookup index name listed in the OPF. The `scriptable` attribute makes the entry accessible from the index. The only possible value for the `scriptable` attribute is "yes". The `spell` attribute enables wildcard search and spell correction during word lookup. The only possible value for the `spell` attribute is "yes".

Example:

```
<idx:entry name="english" scriptable="yes" spell="yes">
```

The `<idx:entry>` tag also may carry an `id` attribute with the sequential id number of the entry. This number should match the value of the `id` attribute in an anchor tag used for cross-reference linking:

Example:

```
<idx:entry name="japanese" scriptable="yes" spell="yes" id="12345">
<a id="12345"></a>
```

The entry id number is not used for in-book lookup; instead, the wordform entity to be indexed for lookup must be contained in the `<idx:orth>` element as described in the following sections.

<idx:orth>..</idx:orth>

The `<idx:orth>` tag is used to delimit the label that will appear in the index list and that will be searchable as a lookup headword. This is the text that users can enter in the search box to find an entry.

Example:

```
<idx:orth>Label of entry in Index</idx:orth>
```

Here is an example of an extremely simple entry that could be part of an English dictionary. From this example code, the word "chair" would appear in the index list and would be searchable by users.

Example:

```
<idx:entry>
<idx:orth>chair</idx:orth>
A seat for one person, which has a back, usually four legs, and sometimes two arms.
<idx:entry>
```

The `value` attribute can be used on the `<idx:orth>` tag to include a hidden label in the entry. This attribute maintains lookup functionality in the presence of the special formatting that commonly appears on headwords in dictionaries.

Example:

```
<idx:orth value="Hidden Label of entry in Index">Display format</orth>
```

If the headword should be displayed in the dictionary with a superscripted number to indicate homographs, with a registered trademark symbol, with middle dots to separate syllables, or with any other added symbols, this special formatting should appear on the text between the `<idx:orth>` tags, but not on the text in the `value` attribute. The text in the `value` attribute should match exactly the form to be used for lookup. If a `value` attribute is not supplied, then the entity between the `<idx:orth>` tags will be indexed for lookup. If middle dots, superscripted numbers, or any other symbols are included in the text between the `<idx:orth>` tags, then *in-book lookup will fail* unless a hidden label with the lookup form is supplied in the `value` attribute.

Example:

```
<idx:orth value="Amazon">A•ma•zon®<sup>3</sup></orth>
```

If the dictionary uses more than one orthographic script, then the `format` attribute on the `<orth>` tag can be used to identify each script for building the index.

Example:

```
<idx:orth format="script name">
```

Along with this primary index of headwords for all entries in the dictionary, in-book lookup also requires a supplementary index of inflected forms for each headword. To build the hidden inflection index, additional data should be nested within the `<idx:orth>` tag as follows.

14.4 Inflections for Dictionaries

Dictionaries should be built so that multiple inflected forms of a single root word all access the same entry. A complete list of inflected wordforms should be provided for every headword. If an entry uses multiple orthographies, then separate inflections must be provided for each orthography.

14.4.1 Inflection Index

To construct the hidden inflection index, the inflected wordform data should be wrapped within `<idx:infl>` and `<idx:iform />` tags nested inside the `<idx:orth>` element. This index will not be directly searchable by the user, but instead will be used for in-book lookup.

`<idx:infl>..</idx:infl>`

The `<idx:infl>` element may contain multiple `<idx:iform />` elements. The `<idx:iform />` elements are always empty elements, and are used only to carry attributes, not visible content. The `value` attribute indicates the inflected forms that make up the inflection index.

Example:

```
<idx:orth>record

<idx:infl>

<idx:iform value="records" />

<idx:iform value="recording" />

<idx:iform value="recorded" />

</idx:infl>

</idx:orth>
```

The `<idx:infl>` tag, the `<idx:iform />` tag, and the `value` attribute are mandatory. The `<idx:infl>` element also may carry an optional `inflgrp` attribute to denote part of speech, and the `<idx:iform />` element may carry an optional `name` attribute to indicate the inflection paradigm category. For languages that use extensive inflection, including these optional categories will expand the size of the inflection index and may result in slower performance during word lookup.

Example:

```
<idx:orth>record

<idx:infl inflgrp="noun">

<idx:iform name="plural" value="records" />

</idx:infl>

<idx:infl inflgrp="verb">

<idx:iform name="present participle" value="recording" />

<idx:iform name="past participle" value="recorded" />

<idx:iform name="present 3ps" value="records" />

</idx:infl>

</idx:orth>
```

The values listed as attributes of the `<idx:iform />` tag will be invisible to the user, but rather will provide the information needed to redirect from inflected forms to the associated headwords during in-book lookup. To inform the user about parts of speech or inflection paradigms, additional text should be included in the body of the entry (i.e., alongside the definition and examples).

<idx:key>..</idx:key> (DEPRECATED)

Like the `<idx:infl>` tag, the `<idx:key>` tag is designed to enable search for an entry in the index by means of an alternative lookup wordform. However, the presence of `<idx:key>` tags in a Kindle dictionary can create instability in the lookup functionality and can interfere with the operation of the exact-match parameter (see section 14.4.2). For these reasons, the use of `<idx:key>` tags in Kindle dictionaries is deprecated. Instead, `<idx:infl>` and `<idx:iform />` tags should be used to wrap the alternative lookup forms.

14.4.2 Exact-match Parameter

By default, the Kindle device uses a fuzzy algorithm for matching diacritics during word lookup. Languages that use contrastive diacritics to distinguish between distinct word forms should use the `exact="yes"` attribute in the `<idx:iform />` tag to force exact match of diacritics during lookup.

Example:

```
<idx:entry name="spanish" scriptable="yes" spell="yes">
<a id="12345"></a>
<idx:orth value="uña"><b>uña</b>
<idx:infl>
<idx:iform value="uñas" exact="yes" />
</idx:infl>
</idx:orth>
```

Setting the `exact` parameter to "yes" forces the device to match *uñas* to the headword *uña* ('fingernail') and prohibits a match to *una* ('one').

14.5 Building a Dictionary with KindleGen

When building a dictionary with KindleGen via the command line, use the following syntax:

```
kindlegen.exe [filename.opf] -c2 -verbose -dont_append_source
```

If the dictionary entries are contained in a single, very large XHTML file, then KindleGen may not be able to build the dictionary. If the dictionary fails to build, this problem may be resolved by splitting the dictionary content into two or more XHTML files.

For more guidance on using KindleGen, see section 2.2.1.

14.6 QA Standards—Testing Kindle Dictionaries

14.6.1 Format Testing

Amazon recommends verifying that the converted dictionary is properly formatted to provide a good visual experience for the user:

- Check the formatting of the definitions by paging through the dictionary and reading several definitions. (The format of the dictionary may be checked using Kindle Previewer or any Kindle device; however, lookup testing requires the use of an E-reader device.)
- Check words for unsupported characters, broken or joined words, proper display of accented characters, symbols, pronunciation guide, etc.
- Check that there are no typos.
- Check that links (if present) are working correctly. (Links will be disabled in the in-book lookup window, but links should function inside the dictionary itself.)
- If any images are used, check that these images are clear and readable.
- Check that the font color and typeface are not forced.

14.6.2 Lookup Testing

Amazon recommends verifying that definitions return correctly when the dictionary is used to look up words in other books. This component of testing can be done only with E-reader devices (not including Previewer), because only E-reader devices allow the user to set the default dictionary for lookup.

- Sideload the dictionary onto the E-reader device. To do this, connect the Kindle to your computer with a USB-to-mini-USB cord. Your computer should detect the device. In the window that pops up, you should see a folder called Documents. Put the dictionary file into this folder and then eject your Kindle from the computer.
- Set the test dictionary as the default dictionary for lookup:
 - Kindle Paperwhite: Go to **Home > Menu > Settings > Device Options > Language and Dictionaries > Dictionaries > [Source Language]**
- Look up a variety of words to see what definition is returned. Open a title other than the dictionary, select a word, and note the definition returned in the lookup window. If lookup fails entirely, check for errors in the HTML tagging.

Suggestions of words to look up include:

- Conjugations of regular and irregular verbs
 - **Example:** walk, walks, walked, walking; go, goes, went, gone, going
- Nouns, adjectives, adverbs and their conjugations/declensions
 - **Example:** desk, desks; wolf, wolves; hot, hotter, hottest
- Grammatical and punctuation conventions commonly used in the language
 - **Example:** contractions, elisions, verbs with clitic pronouns
- Check the index view of the dictionary. To do this, open the dictionary and start typing a word in the **Search** box. An alphabetized list of headwords should appear and should update dynamically based on which letters are typed. Selecting a headword from the index list should redirect the user to the dictionary entry for that headword.

Part IV. Appendices

15 Appendix A: Enhanced Typesetting and Page Flip

15.1 About Enhanced Typesetting

Enhanced Typesetting is a series of typographical and layout features that are automatically enabled on Kindle books. These enhancements improve readability and enforce more consistent display behavior across Kindle reading platforms, including Kindle devices, Fire tablets, and free Kindle reading applications for Android and iOS. Some Enhanced Typesetting features include:

- Drop caps that dynamically adjust with font size
- Hyphenation and smoother word spacing
- Kerning and ligature improvements
- Enhanced table formatting (see section 9.5.4 for further information)

15.2 Support for Enhanced Typesetting

If Enhanced Typesetting is enabled for your book, you will see “Enhanced Typesetting: Enabled” on that book’s detail page. Amazon is continuously working to make Enhanced Typesetting compatible with more titles and will automatically enable Enhanced Typesetting enhancements for your book when possible.

Read more about Enhanced Typesetting at <http://www.amazon.com/betterreading>.

15.3 About Page Flip

Page Flip is a reimaged Kindle navigation experience that makes it easy to explore books while always saving your place. Page Flip is available on select Kindle E-readers, Fire tablets, and the free Kindle application for iOS and Android.

Page Flip automatically saves a reader's place as they browse through the book

With Page Flip, readers can view multiple pages at once to better locate a chart or image

15.4 Support for Page Flip

If Page Flip is enabled for your book, you will see “Page Flip: Enabled” on that book’s detail page. Amazon is continuously working to make Page Flip compatible with more titles and will automatically enable Page Flip enhancements for your book when possible.

Read more about Page Flip at <https://www.amazon.com/b?node=13632018011>.

16 Appendix B: HTML and CSS Tags Supported in Kindle Format 8

For guidelines regarding the use of HTML or CSS, refer to section 6.

16.1 HTML Support Table

HTML Tag	Supported on KF8-Enabled Devices and Applications
<!-- . . . -->	Yes
<!DOCTYPE>	Yes (not on E-reader)
<?xml?>	Yes
<a>	Yes
<address>	Yes
<article>	Yes
<aside>	Yes
<audio>	No
	Yes
<base>	No
<big>	Yes (deprecated – recommend using CSS instead)
<blockquote>	Yes
<body>	Yes
 	Yes
<canvas>	No
<caption>	Yes
<center>	Yes (deprecated – recommend using CSS style text-align:center instead)
<cite>	Yes
<code>	Yes
<col>	Yes
<command>	No
<datalist>	No
<dd>	Yes
	Yes
<dfn>	Yes
<div>	Yes
<dl>	Yes

HTML Tag	Supported on KF8-Enabled Devices and Applications
<dt>	Yes
	Yes
<embed>	Only SVG is supported
<eventsource>	No
<figcaption>	Yes
<figure>	Yes
	Yes (deprecated – recommend using CSS instead)
<footer>	Yes
<form>	No
<h1>	Yes
<h2>	Yes
<h3>	Yes
<h4>	Yes
<h5>	Yes
<h6>	Yes
<head>	Yes
<header>	Yes
<hgroup>	Yes
<hr>	Yes
<html>	Yes
<i>	Yes
<iframe>	No
	Yes
<input>	No
<ins>	Yes
<kbd>	Yes
<keygen>	No
	Yes
<link>	Yes
<mark>	Yes

HTML Tag	Supported on KF8-Enabled Devices and Applications
<marquee>	No
<menu>	Yes
<nav>	Yes
<noscript>	No
<object>	Only SVG is supported
	Yes
<output>	Yes
<p>	Yes
<param>	No
<pre>	Yes
<q>	Yes
<rp>	Yes
<rt>	Yes
<samp>	Yes
<script>	Reserved for Amazon use only
<section>	Yes
<small>	Yes
<source>	Yes
	Yes
<strike>	Yes
	Yes
<style>	Yes
<sub>	Yes
<summary>	Yes
<sup>	Yes
<table>	Yes
<tbody>	Yes
<td>	Yes
<tfoot>	Yes
<th>	Yes

HTML Tag	Supported on KF8-Enabled Devices and Applications
<thead>	Yes
<time>	Yes
<title>	Yes
<tr>	Yes
<u>	Yes
	Yes
<var>	Yes
<video>	No
<wbr>	Yes

16.2 CSS Support Table

CSS Attribute	Supported on KF8-Enabled Devices and Applications
/*Comment*/	Yes
@import	Yes
@charset	Yes
@font-face	Yes
*	Yes
background	Yes
background-attachment	Yes
background-color	Yes
background-image	Yes
background-position	Yes
background-repeat	Yes
background-clip	Yes
background-origin	Yes
background-size	Yes
border	Yes
border-bottom	Yes
border-collapse	Yes
border-color	Yes

CSS Attribute	Supported on KF8-Enabled Devices and Applications
border-left	Yes
border-radius	Yes
border-right	Yes
border-spacing	Yes
border-style	Yes
border-top	Yes
border-width	Yes
bottom	Yes
caption-side	Yes
clear	Yes
clip	Yes
color	Yes
color-index	Yes
counter-increment	No
counter-reset	No
device-aspect-ratio	Yes
device-height	Yes
device-width	Yes
direction	Yes
display	Yes
E	Yes
E + F (Direct adjacent)	No
E ~ F (Indirect adjacent)	No
E.class	Yes
E#id	Yes
E::after	No
E::before	No
E::first-letter	No
E::first-line	No
E:first-child	No

CSS Attribute	Supported on KF8-Enabled Devices and Applications
E:first-of-type	No
E:last-child	No
E:last-of-type	No
E:link	Yes
E:nth-child	No
E:nth-last-child	No
E:nth-last-of-type	No
E:nth-of-type	No
E:only-child	No
E:only-of-type	No
E:visited	No
empty-cells	Yes
float	Yes
font	Yes
font-family	Yes
font-size	Yes
font-style	Yes
font-variant	Yes
font-weight	Yes
height	Yes
left	Yes
letter-spacing	Yes
line-height	Yes
list-style	Yes
list-style-image	Yes
list-style-position	Yes
list-style-type	Yes
margin	Yes
max-height	No
max-width	No

CSS Attribute	Supported on KF8-Enabled Devices and Applications
min-height	Yes
min-width	Yes
monochrome	Yes
opacity	Yes
outline	No
outline-color	No
outline-offset	Yes
outline-style	No
outline-width	No
padding	Yes
position	Yes
right	Yes
text-align	Yes
text-decoration	Yes
text-indent	Yes
text-overflow	Yes
text-shadow	Yes
text-transform	Yes
top	Yes
vertical-align	Yes
visibility	Yes
white-space	Yes
width	Yes
word-spacing	Yes
word-wrap	Yes
z-index	Yes

17 Appendix C: Media Queries

Media queries are blocks of CSS code that allow content creators to apply different styles to specific Kindle devices (or a group of devices) using only one style sheet. Amazon has implemented media queries as a way to help content creators build a better customer experience across devices.

Amazon recommends that content creators only use media queries if they solve a problem or provide a better customer experience. For example, you can use media queries to:

- Create custom drop cap solutions for specific devices or groups of devices.
- Change light-colored text (yellow, baby blue, pink, etc.) to darker colors that provide better contrast on E-reader while retaining the original color on tablet devices.
- Increase the font size for fixed-layout text pop-ups on E-reader devices separately from tablets to accommodate the difference in screen sizes.
- Display colored borders on E-reader and colored backgrounds on tablets independently from each other, allowing you to better replicate the print experience on tablets without sacrificing the reading experience on E-reader devices.

This section describes ways that you can use media queries to customize the reading experience on Kindle E-reader devices, Fire tablets, and iPads. You can also use these same principles across all Kindle platforms for devices of all aspect ratios.

Media queries are part of the W3 standard. For more information, visit <http://www.w3.org/TR/css3-mediaqueries/>

17.1 Media Query Guidelines

Support for two new media types enables content creators to use specific CSS based on the Mobi or KF8 file format: amzn-mobi and amzn-kf8.

- For KF8 CSS styles, use the media query @media amzn-kf8. This is only applied for the KF8 format.
- For Mobi CSS styles, use the media query @media amzn-mobi. This is only applied for the Mobi format.

The @media screen and @media all styles continue to apply to both KF8 and Mobi.

17.1.1 Use Correct CSS Syntax

Media queries consist of two parts: (1) the selector, which specifies the conditions of the media query; and (2) the declaration block, which is rendered when the conditions of the media query are met.

In the following example, the blue background color is only applied if the format of the book is KF8 and the aspect ratio of the device is 1280 x 800.

Example:

```
/* Kindle Fire (All) Formatting. */

@media amzn-kf8 and (device-aspect-ratio:1280/800) {

    .blue_background {
        background-color: blue;
    }
}
```

```

    }
}
```

17.1.2 Add a CSS Comment Before Each Media Query

Amazon recommends that you add a CSS comment before each media query to clarify which device you are targeting. (A CSS comment starts with /* and ends with */.)

Example:

```
/* Kindle Fire (All) Formatting */
```

CSS comments are invisible to the customer, but they make the code much easier to navigate and troubleshoot for anyone who works on the file.

17.1.3 Always Use Non-Media Query Code To Target E-Reader Devices

Always optimize your non-media query (“default”) code for Kindle E-reader devices (including Kindle Voyage and Kindle Paperwhite). The default code contains the CSS values that will appear on an E-reader when none of the media queries match that particular device.

17.1.4 Media Queries Should Appear After Non-Media Query Code

Since CSS is applied in the order that it appears, code that targets multiple devices (such as the `device-aspect-ratio` code that targets all Fire tablets) should appear after any non-media query code.

In the following example, the default code creates a black border on every device for any element that uses the `blue_background` class. The media queries that follow it remove the border and display a blue background on Fire tablets and iPad for any element that uses the `blue_background` class. All other devices will only display the black border.

Example:

```
/* Default Formatting. Use this for Kindle E-reader. No media queries required. */
.blue_background {
    border: 1px solid black;
}

/* Kindle Fire (All) Formatting. Use this to target all Fire Tablets. */
@media amzn-kf8 and (device-aspect-ratio:1280/800) {
    .blue_background {
        background-color: blue;
        border: none;
    }
}
```

```
/* iPad (3, Air, Mini) Formatting. Use this for any iPad. */

@media (device-width: 768px) {

    .blue_background {
        background-color: blue;
        border: none;
    }
}
```

In the example above, the black border defined in the default code for the `blue_background` class will still appear on Fire tablets if the `border` property is not overridden. Setting the `border` to `none` in the media queries for Fire tablets and iPad ensures that the default values for these properties are overridden. This is helpful if you are using non-media query code to target Kindle E-reader devices and do not want to transfer a colored border to a Fire tablet.

17.1.5 Avoid Duplicating Code

When writing media queries, only include the CSS classes and code that you need to change for that particular device. Any non-media query code that you use will automatically appear on all devices unless it is overwritten with a media query, so you do not need to repeat code that you want to apply to all devices.

In the following example, the goal is to override a colored border on Fire tablets and replace it with a colored background, while keeping the text red for all devices. The example on the left is incorrect because repeating the `.red_font` class in the media query code is not necessary.

Example:

Incorrect Media Query	Correct Media Query
<pre>/* Default formatting. */ .blue_background { border: 1px solid blue; } .red_font { color: red; } /* Kindle Fire (All) Formatting */ @media amzn-kf8 and (device-aspect- ratio:1280/800) { .blue_background { background-color: blue; border: none; } .red_font { color: red; } }</pre>	<pre>/* Default formatting. */ .blue_background { border: 1px solid blue; } .red_font { color: red; } /* Kindle Fire (All) Formatting */ @media amzn-kf8 and (device-aspect- ratio:1280/800) { .blue_background { background-color: blue; border: none; } }</pre>

17.2 Using Media Queries

The following table outlines examples of supported media queries and the CSS applied to KF8, Mobi, and other readers:

Media Queries in CSS	CSS Applied to KF8	CSS Applied to Mobi	CSS Applied to Other Readers
<pre>@media amzn-mobi { .class1 { font-size:3em; font-weight: bold; } }</pre>	-	font-size:3em; font-weight: bold;	-

Media Queries in CSS	CSS Applied to KF8	CSS Applied to Mobi	CSS Applied to Other Readers
<pre>.class1 { font-style: italic; font-size: 2em; } @media amzn-mobi { .class1 { font-size: 3em; font-weight: bold; } }</pre>	<pre>font-style: italic; font-size: 2em;</pre>	<pre>font-style: italic; font-size: 3em; font-weight: bold;</pre>	<pre>font-style: italic; font-size: 2em;</pre>
<pre>@media amzn-mobi { .class1 { font-size: 3em !important; font-weight: bold !important; } } .class1 { font-style: italic; font-size: 2em; }</pre>	<pre>font-style: italic; font-size: 2em;</pre>	<pre>font-style: italic; font-size: 3em; font-weight: bold;</pre>	<pre>font-style: italic; font-size: 2em;</pre>

Media Queries in CSS	CSS Applied to KF8	CSS Applied to Mobi	CSS Applied to Other Readers
<pre>@media not amzn-mobi { .firstletter { float: left; font-size: 3em; line-height: 1; font-weight: bold; padding-right: .2em; margin: 10px } } @media amzn-mobi { .firstletter { font-size: 3em; } }</pre>	<pre>.firstletter { float: left; font-size: 3em; line-height: 1; font-weight: bold; padding-right: .2em; margin: 10px }</pre>	<pre>.firstletter { float: left; font-size: 3em; }</pre>	<pre>.firstletter { float: left; font-size: 3em; line-height: 1; font-weight: bold; padding-right: .2em; margin: 10px }</pre>
<pre>@media amzn-kf8 { p { color: red; } }</pre>	<pre>p { color: red; }</pre>		

17.3 Using Media Queries for Backward Compatibility with Mobi

Media queries allow one CSS file to supply complex CSS for KF8 and basic CSS for the Mobi format. Some guidelines:

- Complex CSS can be overridden for the Mobi format by redefining the same class inside the `@media amzn-mobi` media query.
- Per the W3C standard, media queries should either be:
 - Individual queries specified after the common CSS; or

Example:

```
class1 {font-size: 2em;}

@media amzn-mobi {.class1 {font-size: 3em;}}
```

- Include `!important` with each property to enforce precedence.

Example:

```
@media amzn-mobi {.class1 {font-size: 3em !important;}}

.class1 {font-size: 2em;}
```

CSS	CSS Styles Applied to Mobi	CSS Styles Applied to KF8
p { font-style: normal; }	p { font-style: normal; }	p { font-style: normal; }
h { font-weight: bold; }	h { font-weight: bold; }	h { font-weight: bold; }
div.example { margin: 10px }	div.example { margin: 10px }	div.example { margin: 10px }
ul { margin: 20px; padding-left: 30px; }	ul { margin: 20px; padding-left: 30px; }	ul { margin: 20px; padding-left: 30px; }
.firstletter { float: left; font-size: 3em; line-height: 1; font-weight: bold; padding-right: .2em; }	.firstletter { float: left; font-size: 3em; line-height: 0; font-weight: bold; padding-right: 0; }	.firstletter { float: left; font-size: 3em; line-height: 1; font-weight: bold; padding-right: .2em; }
@media amzn-mobi { .firstletter { float: left; font-size: 3em; line-height: 0; font-weight: bold; padding-right: 0; } }		

17.3.1 Submitting a Media Query

There are four options for submitting media queries:

- One CSS file
- Different CSS files
- Style tags
- @import

17.3.1.1 Option 1: Using One CSS File.

Media queries can specify different CSS for Mobi and KF8 formats in the same CSS file. In the example below, a different **.class1** class is specified for the Mobi format than for the other formats in the same CSS file.

Example:

```
.class1 {
    font-style: italic;
    font-size: 2em;
}

@media amzn-mobi {
    .class1 {
        font-size: 3em;
        font-weight: bold;
    }
}
```

17.3.1.2 Option 2: Using Different CSS Files

Media queries can specify different CSS for Mobi and KF8 formats in different CSS files. In the example below, the Mobi and KF8 formats utilize different CSS style sheets and the common CSS styles apply to all media.

Example:

```
<link href="common.css" rel="stylesheet" type="text/css">
<link href="kf8.css" media="amzn-kf8" rel="stylesheet" type="text/css">
<link href="mobi.css" media="amzn-mobi" rel="stylesheet" type="text/css">
```

17.3.1.3 Option 3: Using Style Tags

Media queries can specify different CSS for Mobi and KF8 formats directly using `<style>` tags.

Example:

```
<style type="text/css">
<style type="text/css" media="amzn-kf8">
<style type="text/css" media="amzn-mobi">
```

17.3.1.4 Option 4: Using @import

Media queries can specify different CSS for Mobi and KF8 formats directly using `@import` to include different CSS files.

Example:

```
@import
@import url(common.css);
```

```
@import url(kf8.css) amzn-kf8;  
  
 @import url(mobi7.css) amzn-mobi;
```

17.3.2 Using the `display:none` Property with Media Queries

To specify different CSS for the content in Mobi 7 and KF8 format, use the `display:none` property with media queries. Support for the `display:none` property in the Mobi 7 format is available in KindleGen 2.4 and later versions.

Example:

```
.defaultcontent {  
    display: block;  
}  
  
.mobicontent {  
    display: none;  
}  
  
@media amzn-mobi {  
    .defaultcontent {  
        display: none;  
    }  
  
    .mobicontent {  
        display: block;  
    }  
}
```

17.3.2.1 Using the `display:none` Property with Complex Tables

Tables have extensive support in KF8, but complex tables do not render well in Mobi 7. With the `display:none` property, you can use an HTML-based table for the KF8 content and an image-based table for Mobi 7, as shown in the example below. Amazon recommends using HTML-based tables when possible as some features may not display well on tables rendered as images. See section 9.5 for further guidance regarding the use of tables.

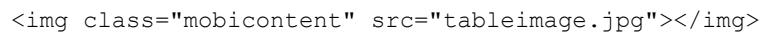
Example:

```
.defaultcontent {  
    display: block;  
}  
  
.mobicontent {
```

```
display: none;  
}  
  
@media amzn-mobi {  
    .defaultcontent {  
        display: none;  
    }  
  
    .mobicontent {  
        display: block;  
    }  
}  
  
<table class="defaultcontent" bordercolor="#E66C2C" border="1" cellpadding="4">  
  
    <tr>  
        <th>Heading</th>  
        <th>Heading</th>  
        <th>Heading</th>  
    </tr>  
  
    <tr>  
        <td>Cell</td>  
        <td>  
            <table bordercolor="#003399" border="1" cellpadding="4">  
                <tr>  
                    <td>Nested</td>  
                    <td>Nested</td>  
                </tr>  
                <tr>  
                    <td>Nested</td>  
                    <td>Nested</td>  
                </tr>  
            </table>  
        </td>  
    </tr>  
}</table>
```

```

</td>
<td>Cell</td>
</tr>
</table>



```

17.3.2.2 Using the display:none Property with SVG Images

The SVG image format is supported in KF8, but not in Mobi 7. With the `display:none` property, you can use an SVG image for the KF8 content and a JPEG image for the Mobi 7 content, as shown in the example below.

Example:

```

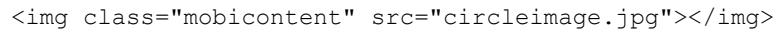
.defaultcontent {
    display: block;
}

.mobicontent {
    display: none;
}

@media amzn-mobi {
    .defaultcontent {
        display: none;
    }

    .mobicontent {
        display: block;
    }
}

<svg class="defaultcontent" xmlns="http://www.w3.org/2000/svg" version="1.1">
    <circle cx="100" cy="50" r="40" stroke="black" fill="red" />
</svg>



```

17.3.2.3 Limitation on Using the display:none Property

Kindle limits usage of the `display:none` property for content blocks beyond 10000 characters. If the `display:none` property is applied to a content block that is bigger than 10000 characters, KindleGen returns an error.

18 Appendix D: Guidelines for Converting XMDF to KF8

18.1 KindleGen Command

KindleGen accepts the folder containing the XMDF source file as input. KindleGen will also accept .zip files. Use the command:

```
kindlegen <folder name>
```

You can use an additional command line option (`-intermediate_only`) to generate intermediate OPF/HTML files:

```
kindlegen -intermediate_only <folder name>
```

This option generates intermediate files as OPF/HTML files in a new folder next to the input folder. KindleGen names this folder with the input folder name followed by `_dump`. To change anything in the intermediate files, use these intermediate HTML or OPF files. The intermediate HTML or OPF files should follow the guidance outlined elsewhere in this document.

The OPF file is named **current_content.opf** and can be found at the same location as the **main.xml** file.

Use the following command to generate the KF8 from OPF/HTML files:

```
kindlegen <OPF File>
```

18.2 Source Issues

An XMDF source can have multiple issues that degrade the reading experience on Kindle. You can correct these issues to improve the reading experience. The following sections list a few of the top source issues found in our testing,

18.2.1 Poor Image Quality

Bad quality images will result in the cover or other image being displayed too small. To avoid this, provide good quality images. For quality requirements, see section 4 Cover Image Guidelines, and section 9.4 Image Guidelines.

18.2.2 Blurred Gaiji Characters

Replace Gaiji characters with corresponding code characters or provide high quality images of at least 64 x 64 to avoid blurring.

Requirements for Gaiji image files:

- Image format: PNG (8-bit) format or JPEG format
- Size: 128 x 128 pixels or greater is recommended

18.2.3 TOC Entries Hanging Style

Use the proper style of positive margin and negative indent to create TOC text with the proper indentation.

Correct:

```
<p top_line_indent = "-1em" top = "1em">

<char_id char_id = "CR0002">Part 1</char_id><br/>

<char_id char_id = "CR0004">Sub-Part 1</char_id><br/>

<char_id char_id = "CR0006">Sub-Part 2</char_id><br/>

</p>
```

Incorrect:

```
<char_id char_id = "CR0002">Part 1</char_id><br/>

<char_id char_id = "CR0004">Sub-Part 1</char_id><br/>

<char_id char_id = "CR0006">Sub-Part 2</char_id><br/>
```

18.2.4 TOC Entries Not Linked

All TOC items must be linked to the corresponding chapter.

18.2.5 Incorrect Number Orientation in TOC

Apply tate-chu-yoko style for TOC index numbers to avoid incorrect number orientation.

Correct:

```
<char_id char_id = "CR0020">

<yoko>10</yoko>

</char_id>

CHAPTER X
```

Incorrect:

```
<char_id char_id = "CR0020">10</char_id>

CHAPTER X
```

18.2.6 Bold Kanji Characters

Avoid bold style for Kanji characters. This sort of styling makes the characters look blurred.

Correct:

遺

Incorrect:

```
<font bold = "yes">遺</font>
```

18.2.7 Faded Text

Leave the text color unspecified. Using light colors results in faded text.

Some Kindle devices allow the reader to change the background color to black. If text is forced black, it will not be readable in this mode and the book will be suppressed.

18.2.8 No Space Between Images

Use line breaks (`
`) to avoid images rendered without space.

Example:

```
<object type="image/png" src="image1.png"/>
<br/>
<object type="image/png" src="image2.png"/>
```

18.2.9 Images Not Shown In Separate Pages

To display images on separate pages, use separate chapters for each image.

18.2.10 TOC Not Shown

To ensure that the TOC is shown, include all of the important links in `<special_page_link>`.

Example:

```
<special_page_link>
<special_page title="Chapter 1">PG1111</special_page>
<special_page title="Chapter 2">PG1112</special_page>
...
</special_page_link>
```

18.2.11 Large Amount of Text Is Not Centered

Do not use the `valign="middle"` style for large amounts of text.

18.2.12 Duplicate IDs

Do not use the same Flow ID/Page ID mentioned in the source. Use unique ID names.

18.2.13 File Path and File Name Requirements

Do not use the backward slash (\) for specifying file path; always use the forward slash (/) instead. Do not include special characters (such as !, @, #, \$) in the file path or file name.

18.3 Unsupported Features

Some XMDF features are not supported in Kindle. If the file has such features, KindleGen displays an error message and fails the conversion. These are the unsupported features.

Serial No.	Feature	Tag	Example
1	Image animations	flip_animation	<pre><flip_animation renewal_time="500ms" > <flip_animation_source src="aaa9.jpg" type="image/jpeg"/> <flip_animation_source src="aaa2.jpg" type="image/jpeg"/> ... </flip_animation></pre>
2	Comic books	comic_object_entry	<pre><parts_module> <object_table> ... <comic_object_entry src="comic9.xml" type="application/x-bvf-comic" object_id="OB0001"/> </object_table> </parts_module></pre>
3	Sound media	sound_object_entry	<pre><parts_module> <object_table> ... <sound_object_entry src="movie9.3g2" type="video/3gpp2" object_id="OBmv00"/> </object_table> </parts_module></pre>
4	Movie media	movie_object_entry	<pre><parts_module> <object_table> ... <movie_object_entry src="movie9.3g2" type="video/3gpp2" object_id="OBmv00"/> </object_table> </parts_module></pre>
5	Search pages	search_page_object_entry	<pre><parts_module> <object_table> ... <search_page_object_entry src="spage9.xml" type="text/x-bvf-search-page" object_id="OBSP01" /> </object_table> </parts_module></pre>
6	Clickable area in images	pointer_region	<pre><event> <trigger> <trigger_pointer id="OB003k/CR0001" action_flag="click"> <pointer_region> <vertex position="(0,0)"/> <vertex position="(100,0)"/> <vertex position="(100,100)"/> <vertex position="(0,100)"/> </pointer_region> </trigger_pointer> </trigger> <action></pre>

Serial No.	Feature	Tag	Example
			<action_page_jump page_id="PG0043"/> </action> </event>
7	Trigger action pointing to a URL with ampersand HTML entity	action_page_jump	<event> <trigger> <trigger_pointer id="OB0006/CR0015" action_flag="click"/> </trigger> <action> <action_page_jump book="http://www.japanvisitor.com/index.php?cID=359&#amp;pID=986" book_type="text/html"/> </action> </event>

18.3.1 Ignored Features

For some features that are not supported, KindleGen does not error out. Instead, KindleGen ignores them and proceeds with the conversion. These are the ignored features.

Serial No.	Feature	Tag/Attribute	Example
1	Pronunciation	Reading attribute	<title reading="PI">π</title>
2	Alternative code and set for Gaiji	Attributes alt_set and alt_code of tag external_char	<external_char alt_set="sh_extchars" alt_code="0x2345" alt="間"/>
3	Permission information	permission_info	<permission_info> <print_permission permission="authorized"/> </permission_info>
4	Line breaking method	line_breaking_method	<line_breaking_method method="word_wrap">
5	Play back	action_play	<event> <trigger> <trigger_pointer id="OB0006/CR0015" action_flag="click"/> </trigger> <action> <action_play object_id="OBkj23"/> ... </action> </event>
6	Opacity for font, background and others	Opacity attribute	

Serial No.	Feature	Tag/Attribute	Example
7	Background music	text_default_background_music	<pre><text_default_attribute> <text_default_background_music src="9.mp3" type="application/x-smaf" loop="yes"/> ... </text_default_attribute></pre>
8	Drop cap	drop_cap	<pre><p drop_cap="2">Alice was...</p></pre>
9	Scrolling text content	scrolling_text	<pre><scrolling_text> This text will be scrolling over and over </scrolling_text></pre>
10	Content masking	Mask	<pre><mask>42 </mask></pre>
11	Key entries for search	key_entry	<pre><key_entry> <key_item search_word="color" table_id="ST0001"> Color </key_item> <key_item search_word="colour" table_id="ST0002"> Colour </key_item> </key_entry></pre>