

Building in universal accessibility

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This guidance, formerly Chapter 2.4 of the Guidelines for UK Government Websites, is primarily aimed at web developers. It provides practical advice on implementing inclusive websites and accessibility testing.

Note: While much has changed since this document was originally written, including updated versions of software and coding standards, the broad principles it espouses remain valid.

Background

This section ensures that a UK government website is developed to serve the largest possible audience using the broadest range of systems (hardware and software platforms) and that the needs of users with disabilities are considered.

We cannot count on our users having standard technology, therefore, to ensure access to our information on the web the onus is on our web managers to deliver the message in a way that allows everyone to benefit.

It is very important that your organisation's website is not only user-centered and usable at the outset but maintains that level of accessibility and usability throughout its existence.

Guidance

Checklist and summary

Checklist

1.
 - Keep pages simple
 - Be consistent throughout the website
 - Use HTML as the default information format
 - Browser-specific HTML or scripting methods should not be used in the website
 - Keep the use of images to a minimum – consider the use of thumbnails
 - Do not rely on colour to convey information
 - Text colour must always contrast with background
 - Only use clear, commonly used fonts
 - Use HTML to structure the document, not style it
 - Use Cascading Style Sheets to format and style basic elements of a website
 - Any font sizes defined in the Cascading Style Sheet must be customisable by the end user – do not hard code
 - Any colour used must be customisable by the end user
 - HTML page should validate against specified version of HTML
 - All important images must have an 'alt' attribute and description
 - 'alt' descriptions should be meaningful
 - A consistent text navigation bar should be used along with a 'skip navigation link'
 - Other forms of navigation should be available for users who cannot use pointing devices
 - If used, imagemaps should always be in client-side format
 - A text alternative must be offered if a client-side imagemap is used

- ❑ An alternative text version of any information offered in audio or video format must be supplied
- ❑ Any information offered in a format that requires a plug-in must also be offered in HTML
- ❑ All web pages must comply to the World Wide Web Consortium's Web Accessibility Initiative (WAI) 'A' standard
- ❑ The appropriate WAI logos can be displayed on the organisation's homepage to illustrate compliance with W3C recommendations

Summary

2. A myth surrounding website development is that building accessible and inclusive pages is expensive, they have to be dull and boring, and they have to be written for the lowest common denominator – this is not the case! It is also not the case that users must view a web page the way the designer intended. With the range of browsers, screen sizes, colour depths and other user preferences it is often not possible to have a web page look the same to all users.
3. What is important is that users should be able to view a web page the way they wish to view it with the equipment that they have available and avoid those negative experiences that result in losing repeat visits.
4. Integrating accessibility into your web development process efficiently creates websites that work effectively for more people in more situations – and that means more users. The challenge to your web developers has to be in creating web pages that are both visually appealing and fully accessible to a wide range of users.
5. We are moving into a world in which managing different versions of your content will become the norm. You will provide different content for different media such as mobile devices. You are likely to design and write content in order to communicate with different audiences as well. The advent of broadband access will mean that more multimedia content will also be appropriate.
6. Equally, to make a website inclusive, there needs to be alternatives to support people and systems with differing abilities. This is not just an issue for the disabled. Some corporate systems are protected by firewalls that strip out active content. Accessibility is also an issue when communicating with a business audience.
 - if frames are used, a valid **noframes** element must be used and each frame within the frameset must have the **title** attribute set.

- **scripts** and **applets** should be supported by a **noscript** element for those users who access via browsers with scripting disabled or via firewalls with scripting blocked out.
 - text equivalents, or transcripts must support **non-text elements** – multimedia or graphically presented information.
 - Alternative **text-only** pages **should rarely be necessary and are not best practice**. If text-only pages are used it is essential that their content:
 - is as complete and comprehensive as graphic content
 - is updated simultaneously with graphic content
 - **colour** alone should not be used to convey information.
 - **navigation** – for the visual user overt controls are used to move to and interact with the menu, the toolbar, scroll bars, links etc and this is generally done using the mouse pointer. For obvious reasons, people who are visually or physically impaired may require **keyboard equivalents** for these mouse actions. The latest browsers and HTML standards are adding these keyboard equivalents.
7. **Context.** The sighted web user gets a good sense of the content and scope of a web document at a glance. The layout and navigation should enable users to quickly find a specific part of the document.
8. When using screen readers and screen magnifiers only a small part of the screen can be presented at one time. So website users who are dependent upon this technology may have three immediate difficulties:
- obtaining an overview of your web page which includes getting a sense of the structure of the document
 - moving to a specific section of the document, and
 - obtaining access to graphically presented information.
9. For example, screen readers only communicate what the browser or operating system renders. This information is revealed by listening to a synthesised voice or Braille display that presents only text and which ‘speaks’ one piece of information at a time in a serial fashion.
10. **Moving from accessibility to usability.** Accessibility means that a broad range of software and audiences can actually receive your content. It is now mandatory that government websites comply with the minimum level of the World Wide Web Consortiums Web Accessibility Initiative.
11. However, compliance with WAI recommendations alone does not necessarily mean that a website will meet the needs of different users. This is the difference between accessibility and usability. With careful consideration the

site can be written and designed so that it works well when browsed through screen readers or screen magnifiers. For example:

- label all graphics with the alt attribute (commonly known as 'alt tag'), remembering that the screen reader software will announce the 'link to' or 'image' depending upon the source coding used;
- limit the number of overall navigation links to 10 on any single string;
- provide 'skip navigation links' link at the top of each page containing the main menu buttons;
- ensure that users of screen magnifiers do not have to scroll sideways to view important content or navigation
- remember that many people cannot use a mouse but must tab through content to get to the options or information they need on a page.

12. **Text only versions.** Ideally a website should be both accessible and useable. Some websites rely on a non-graphic, text-only version to make their sites accessible. But a text-only version may not be useable if, for example, it contains too many links or is confusing when presented through assistive technology. It is essential to ensure that content is complete and up-to-date.

13. Rather than invest in a text-only version that is not useable, it may be better to clarify the navigation and text to improve usability as well. We would prefer you made the graphic version of your website more usable, taking steps such as reducing numbers of links and clearly describing options and navigation.

14. Where you are using multimedia or plug-ins, such as Macromedia's Flash, we would prefer that the user accesses (as the default) a usable website with an option to choose to use a multimedia alternative rather than being delivered the multimedia version as the default with an option to choose the alternative.

Audiences with special needs

15. There are many people who find it difficult to interact with computer technologies. One of the ways in which government websites differ from commercial sites is the requirement that the needs of these audiences are part of our website strategies.

Key audiences to remember

The inexperienced or technophobic

16. Electronic devices such as video recorders and microwave ovens cause confusion for some people. Others have little experience of computers. For both audiences, the inherent complexities of a home computer can make retrieving information from the web very difficult.

The socially excluded

17. A proportion of the public do not have the means to purchase a home computer. Their job may not bring them into contact with IT and a digital TV may be out of the question. A PC with limited capabilities in the local library may be the only resource available to this sector of the population.

Older users

18. Advancing years can bring one or a combination of the disabilities listed to a user.

Non-English users

19. Many people in the UK do not use English as their first language. Extra care should be taken to ensure that the English used on a web page is clear and simple to understand.

Physical impairments

20. Recent disability figures for the UK suggest that there are:

- over 8.54 million people registered with one form of disability or another;
- of these over 2 million have a visual impairment;
- eight million people suffer from some form of hearing loss;
- one million people have a form of learning difficulty;
- over seven million people have literacy problems.

It is worthwhile remembering that impairments take a variety of forms and can exist together in combination.

21. Specific considerations for the common disabilities are as follows;

Visual impairment

22. The web is superficially seen as a visual medium, but as the majority of information in a website is in text format there are many ways in which this data can be manipulated. Screen reader software reads a web page one line at a time, horizontally across the screen. The text is spoken using a speech synthesiser or alternatively sent to a retractable Braille display or to a fixed single line display. Screen magnification software is used to magnify portions of a screen using a zoom feature. Many people who have visual impairment still have a degree of usable vision. Simply using clear fonts and distinguishable colours may be all that is needed.

Hearing impairment

23. Many people with auditory disabilities have little difficulty in using websites unless streaming audio and video files are used. This can be overcome simply with the use of text captioning. This also assists those non-native speakers who may find written language easier than spoken.

Motor impairment

24. Many diseases and physical conditions can cause a person to have a loss or limitation of function in muscle control or movement, which can mean difficulty in using a conventional keyboard or a mouse. Software such as, Sticky Keys can make difficult keystrokes more accessible and WAI offers the ability to assign hotkeys to navigation elements. The use of speech recognition systems allows the user to speak commands to their computer. Other alternative input devices include pointer devices and eye scanning systems controlled by mouth or head movements.

Cognitive disability

25. Reading difficulties such as dyslexia and limited mental agility can all limit the understanding of information. Users may have problems with memory recall or text recognition; they may also have problems entering information correctly, such as querying a search facility.

Selective disturbance

26. Flickering and flashing text or images can trigger epileptic seizures in some individuals and do not encourage usability among the visually impaired.

IMPORTANT

27. A very simple if not comprehensive way of seeing your existing website in a different light is to turn off the graphics capabilities of your web browser. This will give an indication of your site's usefulness without graphics.

Compliance with W3C WAI recommendations**W3C Web Accessibility Initiative (WAI)**

28. Many people that use the web have disabilities of one form or another, which could be sensory or motor disabilities. It is very important to ensure that any web page produced by public sector bodies is as available to these users as to any other. Government websites are now expected to comply with the W3C WAI recommendations.

29. The W3C states that there are basically **ten quick tips** that should be used to produce web pages that can be seen as truly accessible. They are listed as:

Images and animations	Use the 'alt' attribute to describe the function of each visual
Imagemaps	Use client-side imagemaps and text for hotspots
Multimedia	Provide captioning and transcripts of audio and descriptions of video

Hypertext links	Use text that makes sense when read out of context. For example, avoid 'click here'
Page organisation	Use headings, lists and consistent structure. Use CSS for layout and style where possible
Graphs and charts	Summarise or use the 'longdesc' attribute
Scripts, applets, and plug-ins	Provide alternative content in case active features are inaccessible or unsupported
Frames	Use <noframes> and meaningful titles
Tables	Make line-by-line reading sensible. Summarise
Check your work, validate	Use tools, checklist and guidelines at http://www.w3.org/WAI/Resources

The 14 guidelines of the Web Content Accessibility Guidelines 1.0

30. To ensure that your organisation's website is universally accessible, the following should be considered and implemented.

WCAG 1.0 Guideline	Remarks
Provide equivalent alternatives to auditory and visual content	Provide content that, when presented to the your user, conveys essentially the same function or purpose as auditory or visual content, eg, text summaries or transcripts
Do not rely on colour alone	Ensure that your text and graphics are understandable when viewed without colour
Use mark up and style sheets and do so properly	Mark up documents with the proper structural elements; control your presentation with style sheets rather than with HTML presentation elements and attributes
Clarify natural language usage	Use mark up that facilitates pronunciation or interpretation of abbreviated or foreign text, this assists speech synthesisers and Braille devices, it also allows search engines to find keywords in a natural language
Create tables that	Ensure that your tables have necessary mark up to

transform gracefully	be transformed by accessible browsers and other software
Ensure that pages featuring new technologies transform gracefully	Ensure that pages are accessible even when newer technologies are not supported or are turned off, eg, when style sheets are not supported, when appropriate provide the <noframes> and <noscript> options
Ensure user control of time-sensitive content changes	Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or stopped
Ensure direct accessibility of embedded user interfaces	Ensure that the user interface follows the principles of accessible design: device-independent access to functionality, keyboard operability, eg, do not rely on scripts, applets and plug-ins for essential functions
Design for device-independence	Use features that enable the activation of your page elements via a variety of input devices, eg, if an imagemap is used provide a text alternative
Use interim solutions	Use interim accessibility solutions so that assistive technologies and older browsers will operate correctly
Use W3C technologies and guidelines	Use W3C technologies (according to specification) and follow accessibility guidelines. Where this is not possible or doing so results in material that does not transform gracefully, provide an alternative version of the content that is accessible
Provide context and orientation information	Provide context and orientation information to help your users understand complex pages or elements, eg, complex relationships between parts of a page can be difficult for users with cognitive disabilities and for those with visual impairment
Provide clear navigation mechanisms	Provide clear and consistent navigation mechanisms – orientation information, navigation bars, a site map, etc in order to increase the likelihood that a user will find what they are looking for on your site
Ensure that	Ensure that documents are clear and simple so they may be more easily understood, eg, consistent

documents are clear and simple	shape and feel, use of plain language, recognisable graphics
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Implementation of the W3C WAI 'A' rating

31. A website can be rated at one of three Web Content Accessibility Guidelines conformance levels – A (Priority 1 items), AA (Priority 1 and 2 items) and AAA (Priority 1, 2 and 3 items).

32. All UK government websites are expected to achieve, as a minimum, and adhere to the single 'A' (Priority 1 items) level. When this has been completed the W3C WAI logo can be displayed on the website home page, if required:



WAI 'A' rating accessibility logo

<http://www.w3.org/WAI/WCAG1A-Conformance>

33. If this mark is not achieved, one or more groups will find it difficult to access information on your site. Satisfying this checkpoint is a basic requirement for some groups of the user population to be able to use web documents. The following checklist must be completed before a webpage can be considered to have attained this mark:

34. **In general** (the para references are to WCAG 1.0 Priority 1 checkpoints – <http://www.w3.org/TR/WCAG10/full-checklist.html>)

1.1	Provide a text equivalent for every non-text element (eg via 'alt', "longdesc" or in element content). <i>This includes:</i> images, graphical representations of text (including symbols), image map regions, animations (eg animated GIFs), applets and programmatic objects, ASCII art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks and video.
2.1	Ensure that all information conveyed with colour is also available without colour, for example from context or mark up.
4.1	Clearly identify changes in the natural language of a document's text and any text equivalents, eg captions.

6.1	Organise documents so they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document.
6.2	Ensure that equivalents for dynamic content are updated when the dynamic content changes.
7.1	Until user agents allow users to control flickering, avoid causing the screen to flicker.
14.1	Use the clearest and simplest language appropriate for a site's content.

...and if you use images and imagemaps

1.2	Provide redundant text links for each active region of a server-side image map.
9.1	Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

...and if you use tables

5.1	For data tables, identify row and column headers.
5.2	For data tables that have two or more logical levels of row or column headers, use mark up to associate data cells and header cells.

...and if you use frames

12.1	Title each frame to facilitate frame identification and navigation
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...and if you use scripts and applets

6.3	Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.
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...and if you use multimedia

1.3	Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation.
1.4	For any time-based multimedia presentation (eg a movie or animation), synchronise equivalent alternatives, (eg captions or

	auditory descriptions of the visual track) with the presentation.
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and if all else fails

11.4	If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page.
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UK Government accesskeys standard

35. The accesskey attribute, introduced in HTML4.0, is intended to provide keyboard shortcuts in that they provide an alternative form of navigation.

36. This attribute should be added to the hypertext link element within an HTML page as follows.

```
<a href="whatsnew.htm" accesskey="2"> What's New </a>
```

37. This addition allows users with limited physical capabilities to navigate the organisation's website more easily. There are some drawbacks, for example:

- functionality depends on the type of operating system you are using,
- the attribute is only supported by MS Internet Explorer 4 and above and by Netscape 6x versions,
- with Windows-based systems the user has to press the 'Alt key' and the accesskey, and
- with the Macintosh system the user has to press the 'Ctrl key' and the accesskey.

38. In the example above, the organisation's What's New page has a '2' value given which should be used consistently throughout the Website.

39. When a user visits your department's website for the first time they bring their collective experience gained from all other sites. It is, therefore, important that UK Government Websites adopt a constant accesskeys standard. Variations from this will make it more difficult for users as they have to learn new navigational skills each time.

40. Listed below is the recommended **UK Government accesskeys standard**:

S	Skip navigation
1	Home page
2	What's New

3	Site map
4	Search
5	Frequently Asked Questions (FAQ)
6	Help
7	Complaints procedure
8	Terms and conditions
9	Feedback form
0	Access key details

41. When this navigational system is made available, it is important to inform your website users, as soon as they enter. Otherwise, users who are least able to do so will be faced with a mouse-dependent navigational system that could have been bypassed. Each page could display a message, eg,

'UK government accesskeys system'

42. Web managers can extend this system by attributing any one of the other 25 alphabetic characters to pages within their website but should ensure that the core elements listed above are used. It is important to ensure that the additional keys selected do not compromise shortcut keys used by various browsers, eg, Microsoft Internet Explorer 'alt h' drops down the help menu.

Other accessibility considerations

Download speeds and accessibility

43. Bandwidth or the capacity to send and receive data is an important consideration when designing an electronic document for distribution over the Internet. It is important that the link to the Internet (from the computer serving the pages to customers) has sufficient capacity to be able to handle the expected load. Otherwise, the response to users will be unsatisfactorily slow.

44. Most people today connect to the Internet over a phone line, typically using a modem with a speed of 28.8 to 56 kilobits per second (kbit/s). This 'narrowband' communication requires user to wait while a dial-up connection is made before they can access the Internet, and means that Internet use when connected is slow.

45. Broadband services offer significantly faster data rates, enabling the delivery of services, such as high speed Internet access. These may also be 'always on' connections to the Internet.

46. However, what looks great and downloads quickly within the confines of the Web manager's high-speed network connection does not necessarily work as well for the average user of the Internet. It is probably best to presume that your user is connected through a 28.8 kbit/s modem. Documents published on the web need to be kept small, be linked efficiently and contain only the data and graphics that they require.

Colour blindness and clarity

47. Usability for people with visual disabilities difficulties must always be a primary consideration.

48. When designing a website be aware that complicated background patterns can make it difficult for viewers with low vision and difficulties, such as dyslexia, to interpret foreground information, such as text and hyperlinks.

49.

- If using a coloured background have one that is single and solid, rather than textured or patterned.
- The contrast between the background and the text is very important.
- There are a range of colour combinations that do cause difficulty, for example:
 - Red and green
 - Red and purple
 - Yellow and white/light grey
 - Pink/lavender pastel colours
- White text on a black background will appear thinner than the same weight of font in black on a lighter background. Designers may wish to use a heavier font to compensate for this. White text on a blue background is particularly legible.
- If it is proposed that a background graphic be used to give a solid background colour it will always be better to use the colour itself, rather than the graphic.
- Dyslexia – some users prefer black/dark blue print on a pale blue/yellow background.
- Flexibility – ensure that the chosen colour can be overwritten by the viewer's browser settings.
- Printer friendly – ensure that the text and images are legible when printed out on a standard 300dpi printer using white A4 size paper.

Simulating colour-blind vision <http://www.vischeck.com>

Splash screens and accessibility

50. Some websites use splash screens to introduce the contents of the entire site or a particular section. Such pages, usually containing an image and a brief line of text, are displayed on screen for a set period of time before automatically redirecting the browser to another more descriptive page.

51. Although this technique can be appealing it has limited use and can seriously hinder the accessibility of a website. Some browsers are not capable of following this sort of automatic redirection.

52. It is strongly advised that Web managers do not employ this feature. A W3C recommendation is not to use client-side redirects.

Styling pages for accessibility

53.

- All pages in a website must be clearly laid out.
- CSS should be used to format the basic elements of the page.
- CSS should be used to format the text rendering of the page.
- A page must be easily read and understandable if the CSS is disabled.
- Standard HTML markup should be used to structure the document.
- Only specify standard fonts within documents.
- Always specify whether the font is to be sans-serif or serif as the lowest default setting.
- Ensure that text is always clearly distinguishable from the background colours.
- Do not use proprietary extensions for tags.
- Do not rely on plug-ins to deliver information, always offer an HTML alternative.

IMPORTANT

54. See how your site looks on a browser that cannot use Cascading Style Sheets by disabling the link to the CSS in the HTML file. Now when it is viewed in the browser you will see the data without the styling.

Accessibility with drop down menus and pop-up windows

55. Drop down menus:

- Drop-down menus are generally fine but the JavaScript triggering them can cause some problems for users with screen readers and screen magnifiers.
- A <noscript> alternative is necessary.
- The options offered in a drop-down should be repeated as text links on the same page.

56. Pop-up windows:

- Pop-up windows do not work in all browsers.
- If they are relying on JavaScript to trigger them then some users will not get them and in some cases they will replace the existing content.
- A <noscript> alternative is required.
- They are disorienting for users who cannot see that a new window has been created, eg, users with a screen reader or screen magnifier, or where the pop-up window covers the original one.
- Provide the user with an alternative.

Accessible images

- All images that convey data or link to other areas of the website must include an 'alt' attribute and description.
- Avoid the use of invisible images to aid page layout, use CSS attributes and values. Screen readers pick up references to images. The HTML hspace and vspace attributes are deprecated in HTML4.
- Do not use an image when a text link will work just as well.
- If an image is simply for decorative purposes (a horizontal line, a coloured spacer, a transparent spacer or material termed 'screen furniture' or 'eye candy') and is not essential to the understanding of the website, an empty alt="" should be used, also known as a 'null alt'.
- If the image is a photograph of a named individual or small group of individuals, they should be named within the 'alt' attribute value.
- If an image conveys detailed information, eg a pie chart, that cannot be included within an 'alt' value, link the image to a page that gives the data in textual format.
- If the image is a navigation button then the function it performs should be within the 'alt' attribute value.
- Provide client-side imagemaps, as these do not need to reconnect to the website to work.
- If an imagemap is used, a text navigation alternative should be included to accompany the image.

Accessible multimedia

57. Multimedia content is becoming more common on websites, although the large file sizes and long download times can make this delivery method an unwelcome feature.

58. When you link to an audio or video file, indicate to the user its format (eg, .wav, .au) and size. Do not assume that the user has the requisite media-player software so provide clear instructions on how to obtain this software. Beyond the technical difficulties of installing such software, some firewalls may not actually permit the passage of this material.

59. **Auditory content**, eg recorded voice or music, may be inaccessible to users who have a hearing impairment and will be inaccessible to those with computers with no audio capability or who do not have, or cannot use (because of a firewall), the plug-ins necessary to do the playback.

- Provide a meaningful descriptive text for the audio link and a text transcription of the audio content.
- Provide visual notification of any sounds that are played automatically.

60. Video content may be difficult for those users with visual impairment, or who have computers unable to play video. Hearing impaired users will have the same difficulty with a video as they do with pure audio content.

- Provide meaningful audio descriptions of all video clips.
- Provide text transcription of the audio content and consider including the dialogue and a meaningful description of the visual images.
- Provide video clips that include audio with open captions for reading.

Accessible text

61.

- Is not easy to read long lines of text, however, the number of words per line will depend upon the font size which the user should be able to control.
- Use upper and lower case type.
- Use standard HTML elements and attributes that convey structure rather than presentation for example `<h1>`, ``, ``, `<blockquote>`, `` etc.
- Do not misuse structural elements and attributes for purposes of layout for example avoid use of `<blockquote>` to indent a paragraph.
- Avoid blinking or scrolling text. This creates problems for people with visual disabilities; it creates a difficulty for text-reading software; some moving type is browser specific, eg the marquee element; some moving

- type uses scripting or active content that may also be browser-limited and may not be permitted by some system firewalls.
- Provide an “alt” attribute for horizontal rules.
 - Provide expansions of acronyms and abbreviations.

Accessible lists

62.

- Ensure that list structures are constructed correctly.
- Do not use images for bullet points. Use the bullet styles available in HTML.
- Keep your content easily understandable, for example, a What’s New list should list the most recent documents first.

Accessible tables

63.

- Avoid using tables to arrange text documents in columns.
- Provide summary information for a table using the ‘summary’ attribute.
- Table width should be set using the “%” value rather than a fixed pixel value. The table will then scale to the user’s displayable area and avoid left to right scrolling.

Accessible links

64.

- Text links to documents should be descriptive and convey meaning rather than using just ‘Click here’, for example, ‘Click here to go to the next page’. It is more meaningful to link on the words ‘Go to the next page’.
- Split consecutive links by using, for example, the vertical bar (|) character with a space before and after. This will aid visually impaired readers.
- Provide [keyboard shortcuts](#) for standard navigation items.
- Links do not have to be in the de facto blue.
- For the benefit of viewers with, eg, low vision, or dyslexia, contents links should show which pages have been accessed.
- For the benefit of viewers with low vision or with mobility impairment do consider the size of the hyperlink footprint. A hyperlink to a footnote that uses a superscript figure font, for example, markup such as ‘`¹`’, can be difficult for a user with motor disabilities. Consider using a style that avoids subscript or superscript characters and provide a larger footprint, for example, ‘`[1]`’.

Accessible frames

65.

- Ensure that a website using a frames environment is usable with non-frames-capable browsers by using the <noframes> option.
- Give each frame a meaningful title.

Scripts and accessibility

66. Not all browsers support client -side scripting (JavaScript, JScript and VBScript). Some users choose to disable it and some firewalls do not permit its passage to the desktop. The use of scripts can be a barrier to accessibility and the viewer should not have to solely rely upon them. For example,

- Where appropriate provide an alternative with equivalent text using the <noscript> element. The non-script supporting browsers will display this element containing HTML information.
- The <noscript> element can also contain a hyperlink to an alternative accessible web page with the same content.

```
<noscript><a href="alternative.htm">This is a summary  
of alternative information.</a></noscript>
```

- When using JavaScript to open a popup window from a link, you should not use:

```
<a href="javascript:window.open('logo.htm',  
'popup', 'scrollbars, resizable, width=300,  
height=200')">
```

67. This link will fail to function when JavaScript is not enabled. The following, for example, should work in all browsers, however, it will take the viewer to a new HTML page and they will have to rely on their browser back button to return to your original page:

```
<a href="logo.htm"  
onclick="window.open('logo.htm', 'popup',  
'scrollbars, resizable, width=300, height=200');  
return false">
```

Simple HTML attributes for accessibility

68. Each of the following examples is simple to implement and takes just a few minutes but can make all the difference to many visitors to your website.

69. A number of these additions are only available for use when the HTML 4.01 standard is used to construct the page. If HTML 4.01 is to be used, then the author of the document must use the correct DTD, quoted at the very beginning of the HTML file.

Accesskey

70. This attribute should be added to the hypertext link tag within an HTML page as follows.

```
<a href="whatsnew.htm" accesskey="2"> What's New </a>
```

71. This addition allows users with limited physical capabilities to navigate the organisation's website more easily. Different browsers work in subtly different ways but most will work if the user holds down the 'alt' key and the accesskey value at the same time.

72. In the example above, the organisations What's New page has a '2' value given in accordance with the [UK Government accesskeys standard](#). This should be used consistently throughout the website.

Alt attribute for accessibility

73. This attribute should be added to the image tag within an HTML page as follows:

```

```

74. Keep this attribute short. If used correctly, it will ensure that a meaningful description will be displayed on the browser screen if the link image is unavailable or the browser cannot handle graphics.

75. Structuring the 'alt' attributes correctly allows differentiation between images within the site. The following 'alt' attributes could all be used to describe different possible purposes of an image of a magnifying glass:

Icon: magnifying glass	An icon graphic
Link: search	The same image that is a link to a search page
Photo: magnifying glass	A photographic image

- All images that convey data or link to other areas of the website must include an 'alt' attribute and description.

- Where possible the 'alt' description should be no longer than 100 characters
- Do not use invisible images to aid page layout, where appropriate, use CSS attributes and values instead. Screen readers pick up references to images. The HTML hspace and vspace attributes are deprecated in HTML4.
- Do not use an image when a text link will work just as well.
- If an image is simply for decorative purposes (a horizontal line, a coloured spacer, a transparent spacer or material termed 'screen furniture' or 'eye candy') and is not essential to the understanding of the website, an empty alt="" attribute description should be used.
- If the image is a photograph of a named individual or small group of individuals, they should be named within the 'alt' attribute description.
- If the image is a navigation button then the function it performs should be within the 'alt' attribute value.
- If an image conveys detailed information, for example a pie chart, that cannot be included within an 'alt' description, link the image to a page that gives the data in textual format.
- Provide client-side imagemaps, as these do not need to reconnect to the website to work.
- If an imagemap is used, a text navigation alternative should be included to accompany the image.
- Where images require a description that is inappropriate by use of the 'alt' attribute consider using the 'longdesc' attribute in the tag. This provides a screen reader user with a link to a separate page that contains this comprehensive description. Browser support is currently poor but we should anticipate wider support in the future. The 'longdesc' page should be accessible and you should consider whether it should contain a repeat of the image being described. When using the 'longdesc' attribute the text value is the URL of the long description. The following example shows support for a 'D-link'.

```
<img border="0" SRC="image/photo.gif" alt="a yacht in
harbour" - see long description "width "250"
height="300" longdesc="aboutyacht.htm">
<a href="aboutyacht.htm"> [D]</a>
```

Title attribute for accessibility

76. This attribute can be added to the HTML href element within an HTML page as follows:

```
<a href="game.htm" title="Rules of the game of
football">Football</a>
```

77. This word 'Football' may make sense to the user who can see the rest of the page but is not clear in itself. The title assists the user with a more descriptive message.

78. A screen reader will read out the text contained in this attribute, and there is no way of stopping it. An example of a bad implementation of this attribute would be:

```
<a href="whatsnew.htm" title="This link goes to the  
What's New section of our website, listing all items that  
have been added to the site in the past seven  
days">What's New</a>
```

79. A visually impaired user would have to wait for the entire message in the title attribute to be read and would then have the text element of the page 'What's New' read out as well. This is an example of a link that is self-explanatory and does not require the use of the title attribute

80. It is extremely important to control the number of times the title attribute is used in a page. It is very useful if used correctly, but can be cumbersome and disruptive if overused and badly implemented.

81. The title attribute can also be used within the frame tags.

Summary attribute for accessibility

82. This attribute should be added to the table element within an HTML page as follows:

```
<table border="0" width="100%" summary="Cups of coffee  
sold">
```

83. This attribute must be employed with the same level of control as the title attribute. Correctly used it is helpful and informative. When incorrectly used it will just get in the way.

84. Be careful to avoid replicating any data already supplied in the <caption> tag or in the table heading.

Acronym attribute for accessibility

85. This element can be used within an HTML page as follows:

```
<acronym="World Wide Web Consortium"> W3C </acronym>
```

86. This element can be employed as many times as is necessary in a page. It can be very helpful to users who do not necessarily understand the shorthand language used within an organisation.
87. The use of this attribute is immediate when a user hovers their pointing device over a displayed acronym. A box will appear displaying the descriptive text of the acronym. This is important, when for example, a user is directed to the middle of an organisation's website by a search facility or link from an external body. The organisation-specific acronyms may well all be new to the user and each will need to be explained.

IMPORTANT

88. When buying design services it is inadequate for the designer to simply present colour visuals or mock-ups of the look and feel. It is important these are also presented to you as HTML mark up. When you buy web design you are also buying the source coding that will render the visual onto computer screens and the standard of this is the backbone in achieving HTML validation and meeting the mandatory WAI requirements.

Validation and testing

89. Validation is important in ensuring platform independence, but alone is not sufficient. Developers should ensure that web pages are not dependent on a certain resolution, colour depth or font size. They should test and evaluate an early working version (a beta test) of a site with representative users. This is also known as prototyping.
90. Well-authored HTML is a highly structured and usable mark up language that is backward compatible ensuring that many web browsers can display information contained within a web page and equally providing accessibility at little or no cost. Although the web is often seen as a visual environment, accessible web pages should adjust and remain accessible in any browsing medium and adapt to allow audio and Braille presentations.
91. Once the page is completed it can be checked for conformity to a specific version of HTML by running it against the World Wide Web Consortium (W3C) automated validator. Cascading Style Sheets should be validated using the W3C automated validator. Tagged Adobe PDF files should be tested using a screen reader. This will demonstrate how your information will actually be presented to user and how the reading order and navigational links will work. Hyperlinks should be carefully checked.
92. These validators are available online from the following URLs:

HTML validator service <http://validator.w3.org>

CSS validation service <http://jigsaw.w3.org/css-validator/>

Bobby testing

93. It must always be remembered that the W3C WAI is not a standard but a set of guidelines. There is no automatic way in which an organisation can get its website validated against the guidelines.
94. A page can be compared against the guidelines to raise a Web manager's awareness of certain issues. The leading tool is The Center for Applied Special Technology's (CAST) Bobby software.
95. Individual pages can be run through the Bobby service by visiting the site and typing the page URL into a specific box. The service will scan the page and then return an automated report highlighting areas of concern and suggesting what could be done to rectify them. A downloadable version of Bobby is available for testing an entire site.
96. The reports can look extremely daunting at first because of their length and quantity of detail but it is a service worth persevering with. It must be noted that this application has a number of limitations:
- It will highlight areas that need to be looked at, but will not correct the submitted page.
 - It also suggests using attributes that are not supported by any web browser at present.
 - It does not validate a web page. This should be done using the W3C validator.
 - A Bobby approved certification does not necessarily mean it is usable by all.
97. If required the Bobby logo can be displayed on the organisation's website to show that the test has been completed and that the website complies.



Bobby analysing application <http://www.cast.org/bobby>

IMPORTANT

98. Getting validation clearances, a successful BOBBY test, and a W3C WAI rating does not necessarily guarantee that your site is, eg, accessible via a screen reader.

The WAVE accessibility test

99. The Wave accessibility checker, from Pennsylvania's Initiative on Assistive Technology, is an online service that will check your pages and mark it visually with icons that help you understand how assistive technology will read or display the page. Other useful features are:

- it will show the order in which elements will appear on the page to, eg, a screen reader;
- it denotes "alt" text of images and applets;
- it marks links that contain JavaScript events, headings, and HTML keyboard shortcuts.

Wave accessibility checker [http:// www.temple.edu/inst_disabilities/piat/wave/](http://www.temple.edu/inst_disabilities/piat/wave/)

Page Valet

100. The Page Valet is an online validator with a range of accessibility testing features based on the W3C's Web Content Accessibility Guidelines. Useful features are:

- support for a range of markup languages
- it will show your source code with any errors annotated and highlighted (provided your browser supports CSS).

Page Valet <http://valet.webthing.com/page/>

A-Prompt Toolkit

101. The University of Toronto's Adaptive Technology Resource Centre (ATRC) and the University of Wisconsin's TRACE Centre have jointly developed the A-Prompt Toolkit. This offline Web accessibility verifier has been designed to check for the three WCAG conformance levels – A (Priority 1 items), AA (Priority 1 and 2 items) and AAA (Priority 1, 2 and 3 items). It also checks for compliance with Section 508 of the US Rehabilitation Act. When accessibility issues are detected the toolkit displays relevant dialog boxes and guides to enable the user to fix a range of problems. Some tasks are semi-automated, such as correcting:

- missing 'alt' attributes,
- missing titles on frames, and
- missing row and column headings on data tables.

102. The toolkit can be downloaded to a PC.

A-Prompt Toolkit <http://www.aprompt.ca/>

Portable Document Format (PDF) and accessibility

103. The Portable Document Format (PDF) is widely used in electronic publishing – see [Making PDF files usable and accessible \(TG110\)](#)¹. It is the universal file format that preserves the look and feel of a document, including the fonts, formatting, colours and graphics, regardless of the application and platform used to originate it. Information in PDF is generally considered inaccessible to web users whose disabilities make it difficult to interact with computer technologies.

104. Adobe PDFs have become the portable document format standard for government on the World Wide Web but PDF documents cannot be considered as accessible. However, Adobe have taken considerable steps to improve the accessibility of both their Acrobat software and the information contained in their PDF files. Their latest specification (PDF1.4) is incorporated in Acrobat 5.0 and features some of the following usability enhancements:

- support for assistive technology such as screen readers and/or refreshable Braille output devices through the Microsoft Active Accessibility (MSAA) application programming interface for the Windows operating system;
- the level of contrast between text and background can make a big difference in the legibility of a page and Acrobat allows user to increase contrast by creating custom colour schemes that override the colours specified in a document;
- the ability to zoom in and reflow text on the screen;
- keyboard shortcuts to enable navigation without the use of a mouse.

105. It is important to understand that your legacy PDF documents: those not originally created using the PDF 1.4 specification will remain inaccessible. To give them a level of accessible you have to either:

- recreate them from their source material into tagged Adobe PDF files using the PDF1.4 specification in Acrobat 5, or
- view your documents using the Acrobat Reader 5 with the Make Accessible plug-in.

¹ Making PDF files usable and accessible

http://www.cabinetoffice.gov.uk/upload/assets/www.cabinetoffice.gov.uk/publications/government_it/web_guidelines/pdf_guidance1.pdf

Make Accessible plug-in

106. The Acrobat 5.0 Make Accessible plug-in automatically analyses the logical structure of a document and creates a new version of that file that will read more logically with assistive technology. The plug-in allows the users of Acrobat 5.0 for Windows to convert untagged legacy PDF files into tagged Adobe PDF files. A tagged Adobe PDF file is designed to ensure:

- the information is in the correct reading order on the page;
- includes paragraph attributes needed to reflow text correctly;
- the reliable translation of all text into Unicode so that all characters, eg, hyphens and ligatures, can be read correctly by a screen reader.

Accessible checker

107. The Adobe Accessibility Checker is a tool intended to identify common accessibility problems in Adobe PDF documents. This tool will, eg, check a document for missing ALT information on images, and for unrecognisable character encoding. When found they are logged and reported so that you can choose to fix or ignore the identified problem.

Adobe online accessibility resource <http://access.adobe.com>

Practical tip if your are a sighted web manager

108. To get a rough idea how some screen readers interpret information:

- Sit away from your computer and make sure you cannot see the screen
- Ask someone to take a ruler and lay it horizontally on your computer screen;
- Ask them to read aloud, without pause, from left hand edge of your screen to the right hand edge;
- Ask them where there is an illustration to say the word 'image' and before any hyperlink say the words 'link to';
- Ask them to continue to continue to move the ruler down one line at a time and read without pause.

Better yet, invest in a screenreader yourself – or get an auditor to tell you how useable your pages are on assistive technology.

W3C work in progress

109. The W3C's Web Content Accessibility Guidelines Working Group (WCAG WG) has released a working draft of the Web Content Accessibility Guidelines 2.0. This shows how more generalised, less HTML-specific) WCAG checkpoint might read. These checkpoints explain how to make web content more accessibly to users with disabilities. Working draft available at <http://www.w3.org/TR/WCAG20/>

XML Accessibility Guidelines – W3C has published a working draft at <http://www.w3.org/TR/xmlgl>

Further reading and resources

110. Don't forget that all this is just the beginning of the process of ensuring universal accessibility.
111. Always test your website with a diverse user group. Discussion with other Web managers will only make the task easier. Over time, experience may show that certain elements that were added with the best intentions do not work and they may make extracting data from a page more difficult rather than easier.
112. A number of manuals and guidelines published by W3C expand on the major themes outlined here. It is recommended that Web managers familiarise themselves with their content. A great deal can be achieved by reading through the W3C guidance on this topic.

How People with Disabilities use the Web

<http://www.w3.org/WAI/EO/Drafts/PWD-Use-Web/Overview.html>

Getting started: Making a web site accessible

<http://www.w3.org/WAI/gettingstarted>

Web Content Accessibility Guidelines 1.0

<http://www.w3.org/TR/WCAG10/> or <http://www.w3.org/WAI/GL/WAI-WEBCONTENT-ERRATA>

Checklist for Web Content Accessibility Guidelines

<http://www.w3.org/TR/WCAG10/full-checklist.html>

Techniques for Web Content Accessibility Guidelines

<http://www.w3.org/TR/WCAG10-TECHS>

HTML Techniques for Web Content Accessibility Guidelines

<http://www.w3.org/TR/WCAG10-HTML-TECHNIQUES>

HTML 4.0 Accessibility Improvements

<http://www.w3.org/WAI/References/HTML4-access>

CSS Techniques for Web Content Accessibility Guidelines

<http://www.w3.org/TR/WCAG10-CSS-TECHNIQUES>

Accessibility features of CSS (Cascading Style Sheets)

<http://www.w3.org/TR/CSS-access>

Accessibility features of SMIL (Synchronised Multimedia Integration Language)

<http://www.w3.org/TR/SMIL-access/>

Accessibility features of SVG (Scalable Vector Graphics)

<http://www.w3.org/TR/SVG-access/>

Royal National Institute for the Blind

<http://www.nib.org/digital>

Royal National Institute for Deaf People

<http://www.rnid.org>

Disability Rights Commission

<http://www.drc-gb.org>

British Dyslexia Association

<http://www.bda-dyslexia.org.uk>

Betsie application

<http://www.bbc.co.uk/education/betsie/index.html>

{textualise;}

<http://codix.net/textualise>

Designing a more usable world – for all

<http://trace.wisc.edu/world/>

Simplified Web Accessibility Guide by Glenda Watson

<http://www.webaccessguides.org>

Checklist: Universal usability

113. This checklist should be used by web producers and managers to ensure that the pages presented on the Internet are as accessible and usable as possible to the largest possible audience and comply with the Web Content

Accessibility Guidelines 1.0 Priority 1 checkpoints for achieving W3C Web Accessibility Initiative rating 'A'.

Basics	
Description	Done
Keep pages simple and easy to understand	
Presentation, content and navigation should be consistent throughout the website	
The page must comply with the WAI 'A' standard. Online guidelines are available from the W3C website at http://www.w3.org/TR/WCAG10/	
No website or single HTML page should be developed for a particular browser	
Do not rely on colour to convey any information, review needs of colour blind users	
A consistent text navigation bar should be available at the very top of each page	
HTML must be the default standard for publishing information on the website	
Text	
Text colour must always contrast with background colours	
Use only clear, commonly used fonts	
Avoid the use of small text	
Users should have the ability to scale fonts and change background colours within a website	
Images	
All important images must have an alternative, ie, 'alt' attribute and value	
All 'alt' attributes should be meaningful and as short as practical	
Styling	

Use HTML to structure the document, not style it	
Use Cascading Style Sheets to style objects within a web page	
The website must be legible and easy to use if Cascading Style Sheets are not available to the end user	
Linking alternatives	
A text alternative must be offered when an imagemap is used	
An alternative text version of any information must be offered in audio or video format	
Any information that is offered in a format that requires a plug-in must also be offered in HTML	
General testing	
The website must be tested for accessibility and usability during its development	
W3C HTML validation report from http://validator.w3.org	
If employing CSS then a validation is to be used from http://jigsaw.w3.org/css-validator	
Bobby report to be obtained from http://www.cast.org/bobby	
Page Valet report obtained from http://valet.webthing.com/page/	
A-Prompt off-line web accessibility verifier used http://www.aprompt.ca/	
Each HTML page should be tested against the basic browsers for usability and rendering testing (and you should test using a screen reader)	
Each page within the website must be legible when viewed with only 16 colours	
The website must be easily usable when viewed on a 800 x 600 screen size	
Individual pages must be legible when printed out on standard office/home printers	