



1 About this unit

Software: Firefox, Brackets

Apps: Safari, Koder

Hardware: Laptop/desktop computers

Outcome: HTML challenges and a personal homepage

```
1 <!doctype html>
2 <html>
3 <head>
4 <meta charset="utf-8">
5 <title>Hannah and Adinas web page!</title>
6 </head>
7 <body>
8 <h1>Science experiment</h1>
9 <h3>By Hannah and Adina</h3>
10 <p>In this web page we are going to show you how we cre
11 <p>We started by collecting the ingredients to build ou
12 <li>newspaper</li>
13 <li>flour</li>
14 <li>water</li>
15 <li>a bowl</li>
16 <li>chicken wire</li>
17 <li>paint</li>
18 <li>PVA glue</li>
19 <p>Our project also helped us think like algorithms bec
20 <p>We then made the volcano like this:</p>
```

UNIT SUMMARY

In this unit the children learn about the history of the web, before studying HTML (hypertext mark-up language), the language in which web pages are written. They learn to edit and write HTML, and then use this knowledge to create a web page.

CURRICULUM LINKS

Computing PoS

- Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration.
- Use technology safely, respectfully and responsibly; know a range of ways to report concerns and unacceptable behaviour.
- Use and combine a variety of software (including internet services) to accomplish given goals, including presenting information.

Suggested subject links

- English:** As with any text-based coding, spelling, punctuation and grammar are important.
- History:** Written communication over time, with the web as the successor to printing, could form the subject of 'a study of an aspect or theme in British history that extends pupils' chronological knowledge beyond 1066'.

TRANSLATING THE COMPUTING PoS

- The *internet* is a global *network* of computers, connected together by copper wires, optical fibres, wireless networks and satellites.
- Among other things, the internet allows a web browser on one computer to access, display and interact with documents (web pages) stored on other computers connected to it (web servers).

- Web pages are written in HTML, which defines the structure of a document (i.e. headings and paragraphs) and uses 'tags' to show the function of media on the page, e.g. a link or the address of a picture. The HTML is transmitted using a standard protocol (HTTP). The packets of HTTP data that move between web servers contain the information that allows us to read, view, *communicate and collaborate* via the web.
- Not everything on the web is good, healthy or helpful, and so care is needed to ensure it's *used safely, respectfully and responsibly*. Children need to know how to *report any concerns they have or unacceptable behaviour* they encounter.

LEARNING EXPECTATIONS

This unit will enable the children to:

- understand some technical aspects of how the internet makes the web possible
- use HTML tags for elementary mark up
- use hyperlinks to connect ideas and sources
- code up a simple web page with useful content
- understand some of the risks in using the web.

The assessment guidance on page 50 will help you to decide whether the children have met these expectations.

VARIATIONS TO TRY

- Instead of using X-Ray Goggles, you could download the complete web page and then edit the HTML file, or use a browser extension such as Firebug for Firefox (<http://getfirebug.com>) to view and edit the web page source.
- You could use materials from w3schools (www.w3schools.com), Code Avengers (www.codeavengers.com/web) or Codecademy (www.codecademy.com/curriculum/uk) in place of the materials from O2 Learn (see *Useful links*).

2 Getting ready

THINGS TO DO

- Read the *Core steps* sections of *Running the task*.
- Decide which software/tools are most accessible/appropriate for use with your class.
- Watch the *Software in 60 seconds* walkthrough for this unit.
- Download your chosen software/tools (see *Useful links*).
- Spend some time familiarising yourself with your chosen software/tools.
- Think about the individuals and groups you have in your class. Could you use any of the *Extensions* on pages 44–49 to extend your more able children? Could you use any of the suggestions in *Inclusion* to support children with specific needs, e.g. SEN or EAL? Have you considered how a Teaching

Assistant will support you and the children, if one is available?

- If you will be going off site for this work, make the necessary arrangements.
- If you plan to create accounts on web-based applications, such as Thimble, you should seek the consent of parents or carers.
- You don't need to teach all the steps. Steps 3 and 4 provide contrasting approaches to similar material, so you could omit one of them. You might want to allow more time for Steps 5 and 6.

THINGS YOU NEED

- Relevant exemplification downloaded from the web (see *Useful links*).
- Computers/laptops/tablets loaded with, or having access to, the software/tools you have chosen
- Internet access



CD-ROM RESOURCES

- *Software in 60 seconds* – Using Brackets
- The hidden meanings of URLs
- List of common HTML tags
- Unit poster – HTML code



E-SAFETY

- Ensure the usual safe search settings and filters are in place while the pupils are working on the web.
- Precautions over the protection of the children's identities and contact details should be in place if the children publish any of their material on the open web.
- Creating accounts on some of the web-based applications in this unit (e.g. Thimble) require parental permission.
- Use these lessons as an opportunity to address the risks of the web. It is vital that the pupils learn to keep themselves safe when online, as well as knowing how to use the web responsibly.
- Encourage the pupils to let you know if they have any concerns or see anything inappropriate. Remind them that they can also report concerns to Childline on 0800 1111 or via www.childline.org.uk/talk/Pages/Talk.aspx.



INCLUSION

- Modern text editors, such as Brackets (<http://brackets.io>), provide syntax highlighting, which should make it easier to spot mark up errors, but some learners might benefit from additional support.
- Pupils could supply translations of their own pages, either written by themselves or generated

by Google Translate. For advice on using Google Translate and other translation sites, see page 11.

- Pupils should remember to provide 'alt' text for any images they use (this ensures that visually impaired users can have images described to them).



USEFUL LINKS

Software and tools

- Mozilla Webmaker X-Ray Goggles is a free online tool that makes the HTML code in a web page editable when you click on part of a web page. Install X-Ray Goggles as a bookmark in your web-browser via <https://goggles.webmaker.org>. (Note: this is not supported on Internet Explorer.)
- HTML tutorials from O2 Learn: <http://o2learn.decoded.co/html-css/lesson/0>. A good introduction.
- Mozilla Thimble is at <http://thimble.webmaker.org>, with some starter projects at <http://webmaker.org/starter-makes>. Some of the earlier Thimble projects can be freely copied from http://github.com/mozilla/thimble.webmaker.org/tree/master/learning_projects.
- Adobe Brackets is a free download from <http://download.brackets.io>. The current version links with Google's Chrome browser for live previews.

Online tutorials

- Shay Howe has an excellent introduction to HTML at <http://learn.shayhowe.com/html-css>.

Information and ideas

- FAQ for X-Ray Goggles: <http://wiki.mozilla.org/Hackasaurus/FAQ>.
- A quick guide to viewing source code on various web browsers: www.wikihow.com/View-Source-Code.

3 Running the task – We are HTML editors

Software: Firefox, Brackets

Apps: Safari, Koder

Hardware: Laptop/desktop computers

Outcome: HTML challenges and a personal homepage

Core steps

Step 1: Learning about the web

RESOURCES



- The hidden meanings of URLs



- Internet Archive's Wayback Machine: <http://web.archive.org>
- X-Ray Goggles: <https://goggles.webmaker.org>

POSSIBLE OUTCOME FOR THIS STEP:

/all-series/switched-on-computing/ These are folders on the Rising Stars web server

index.php This is a document (web page) on the Rising Stars web server

Can you explain the meanings of different URLs? Write a URL below and then explain what each part means.

URL: www.bbc.co.uk/cbbc/stars/barney-horwood

www web page is on bbc server
bbc company who created the content
.co.uk registered in the UK
cbbc/stars/b... folders on the BBC web server

- Share the *Learning expectations* for the unit (see page 42) and explain the success criteria.
- Discuss some of the ways the pupils use the web. Highlight ways in which it's used for communication and collaboration, for example web mail, Wikipedia, Google Docs.
- Discuss the distinction between the web and the internet.
- Show the pupils a typical URL (uniform resource locator), e.g. www.risingstars-uk.com/all-series/switched-on-computing/index.php. Ask them if they can work out what each part of the URL means. Use The hidden meanings of URLs sheet (see *Resources*) to clarify this. Ask the pupils to do the same analysis for a few other URLs, such as pages on the school's website.
- Explain that HTTP (hyper text transfer protocol), as in the URL above, is the method used by the web browser and web server programs to communicate with one another.
- Explain that any page on the web can include a hyperlink to any other page on the web, using the URL. Ask the pupils to pick two words or ideas (e.g. football and cheese), and see how few hops it takes to get from a page with the first word or idea to a page with the other, just by following links.

Extensions

SCHOOL

- Some pupils could research the history of the web, perhaps using the internet archive (<http://web.archive.org>).

HOME

- Ask the pupils to write a short summary of what they've learned during this step, perhaps using a text editor, like Brackets, to type up their notes.

Step 2: Editing HTML in web pages

RESOURCES



- Mozilla X-Ray Goggles: <https://goggles.webmaker.org>
- Firebug for editing HTML: <http://getfirebug.com/html>

POSSIBLE OUTCOME FOR THIS STEP:



- Ask the pupils to visit a familiar web page, perhaps the school homepage. Remind them that the way the website looks (colours, styles, images) is the result of computer coding (HTML) that sits 'behind' the page. Show them how to use the browser's Web Developer > Page Source or Inspect Element command to look at the underlying HTML.
- Ask the pupils to visit the X-Ray Goggles homepage (see *Resources*) and drag the Activate X-Ray Goggles to the toolbar in the web browser. Demonstrate that when the X-Ray Goggles are activated, the HTML code used to build the web page becomes editable.
- Demonstrate how to use X-Ray Goggles to edit a web page. Activate the X-Ray Goggles and select an element of the page to edit (e.g. a news headline). Once the code appears, click the *advanced* tab and make some simple changes to the text. Click *commit the changes*.
- Discuss using this tool in a respectful and responsible way. Ask the pupils to make changes to some web pages, e.g. 'hacking' a news page that relates to an historical event. Once the pupils are satisfied with their work, ask them to 'publish' their changes to share with one another, and perhaps a wider audience. Discuss how X-Ray Goggles works. Ask the pupils whether they've really edited the web pages they've been working on (so that everyone else in the world can see their changes). Explain that X-Ray Goggles runs code in their web browser, not on the original website, and that when they 'publish' the changes, they're only saving a copy of the web page to one of Mozilla's web servers.
- Raise an important e-safety point: just because a website looks as though it belongs to a company, it doesn't mean it really is hosted on their web server – it's easy for someone to set up a fake website to collect password and security details.

SCHOOL

- Some pupils could edit web pages using the source editing tools in Firebug or by saving and editing the complete web page to their computers.

HOME

- Ask the pupils to edit one or two web pages at home to see if they can catch their parents or carers out, such as a news or sports page, while bearing in mind the need for responsible and respectful use!

Core steps

Step 3: First steps with HTML

RESOURCES

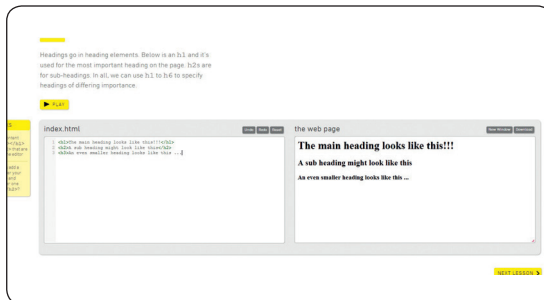


- List of common HTML tags



- The O2 Learn materials begin at <http://o2learn.decoded.co/html-css/lesson/0>. They work best in Firefox.
- Code Avengers: www.codeavengers.com/web/1
- Codecademy: www.codecademy.com/schools/curriculum/resources

POSSIBLE OUTCOME FOR THIS STEP:



- Remind the pupils that HTML is the code that sits 'behind' a web page. Explain that they are going to learn how to use HTML tags. Display the list of common HTML tags (see the CD-ROM).
- Ask the pupils to work through Steps 1 and 2 of the HTML tutorial from O2 Learn. Encourage them to insert multiple sets of tags per step, e.g. by creating two paragraphs rather than one, or creating headings of different levels. Provide any support they need.
- In Step 3 of the HTML tutorial, ask the pupils to create a list of links to web pages on a current curriculum topic. Show them how to click on the link in the right-hand window to check that their HTML coding works (i.e. that it directs the web browser to the correct web page). Remind the pupils how important links are to the web.
- In Step 4 of the HTML tutorial, ask the pupils what happens when they add tags for more than one image (both/all images should appear in the right-hand box).
- The most important part of the HTML tutorial is Step 5. Ask the pupils to look carefully at the structure of the web page, identifying how the HTML code in the left-hand pane determines the appearance of the page shown on the right. Encourage them to experiment with the HTML code to see how this affects the content and appearance of the web page. (Note that the contents of the CSS files referred to here are beyond the scope of this unit.)

Note that Decoded Steps 6 onwards relate to CSS (cascading style sheets) and are beyond the scope of this unit. Therefore, the pupils do not need to undertake these challenges.

Extensions

SCHOOL

- Some pupils could have a go at further HTML tutorials in Code Avengers or Codecademy (see *Useful links*).

HOME

- Encourage the pupils to use the *Page Source* command on web pages they visit, or to turn off the WYSIWYG editor when creating new content on the class blog or learning platform, so they can practise their HTML skills.

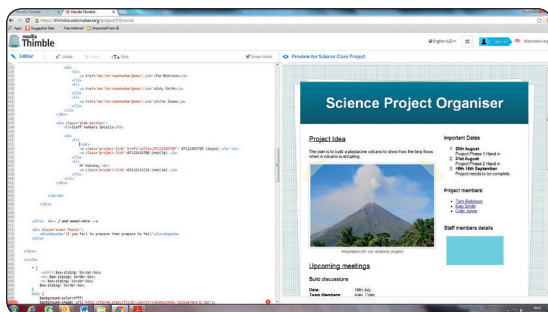
Step 4: An HTML project

RESOURCES



- Mozilla Thimble Editor: <http://thimble.webmaker.org>
- Remixable Thimble projects as a starting point: <https://webmaker.org/en-US/search?type=tags&q=webmaker:template>
- w3schools' interactive list of HTML tags: www.w3schools.com/tags

POSSIBLE OUTCOME FOR THIS STEP:



- Open Mozilla's Thimble Editor on the IWB and remind the pupils of the overall structure of web pages from their work in Step 3. Ask them to demonstrate some of the HTML tags they can remember that aren't already in the editing pane. Ensure you cover the `...` anchor tag as the code to add a link (if necessary, remind the children that they need to include 'http://' at the beginning of URLs so the browser knows which protocol to use to communicate with the server). Remind the pupils how important links are on the web. Demonstrate how the interactive hints work (exclamation mark in red circle), and encourage the pupils to use them.
- Direct the pupils to the site with remixable Thimble projects. Ask them to open one of these projects and work through remixing the code to make it their own. You could ask them all to work on the same project, allow them to choose, or even provide your own starting point for them to adapt.
- Encourage the pupils to find out about further tags for themselves, perhaps by using w3schools' interactive list of HTML tags (see *Resources*). Challenge the pupils to explore ways of using these tags in their Thimble projects.
- Encourage the pupils to share their work with one another, giving and receiving feedback as they do so, and developing their own projects in response to this.
- If the pupils are allowed to register for accounts on the Thimble website (check your school AUP), they can publish their pages on the web. Otherwise they could copy their code and share the contents of their pages through the school's learning platform or their blog, using the source code mode in their blog or VLE editor.

SCHOOL

- The remixable Thimble projects provides ample opportunity for the pupils to extend their skills and knowledge in developing for the web.
- Encourage the pupils to choose one or more extra projects to remix.

HOME

- The pupils could access the Thimble site from home and explain to their parents or carers how they can create or edit a web page using HTML.

Core steps

Step 5: Making a new web page

RESOURCES



- Software in 60 seconds – Using Brackets



- Adobe Brackets: <http://brackets.io>
- Advice on how to write the text for links: www.w3.org/Provider/Style/ReadableText.html

POSSIBLE OUTCOME FOR THIS STEP:

```

1 <!doctype html>
2 <html>
3   <head>
4     <meta charset="utf-8">
5     <title>Hannah and Adina's web page</title>
6   </head>
7   <body>
8     <h1>Science experiment</h1>
9     <h2>By Hannah and Adina</h2>
10    <p>In this web page we are going to show you how we created a working volcano</p>
11    <p>We started by collecting the ingredients to build our volcano structure! These ingredients were:</p>
12    <ul>
13      <li>flour</li>
14      <li>water</li>
15      <li>a bowl</li>
16      <li>chicken wire</li>
17      <li>paint</li>
18      <li>PVA glue</li>
19    </ul>
20    <p>Our project also helped us think like algorithms because we had a list of ingredients and then had
21    <p>We then made the volcano like this:</p>
22    <ol>
23      <li>shaped the chicken wire into a volcano shape (a bit like a mountain)</li>
24      <li>mixed the water and flour together to make a paste</li>
25      <li>stipped up pieces of newspaper</li>
26      <li>spread the newspaper over the chicken wire until it was completely covered</li>
27      <li>waited for the first layer to dry</li>
28      <li>added another layer of newspaper</li>
29      <li>left the second layer to dry</li>
30      <li>Painted the volcano in brown and red and yellow</li>
31      <li>let the paint dry</li>
32      <li>Painted the PVA glue on top</li>
33      <li>let the glue dry</li>
34    </ol>
35    <p>We then had our volcano structure ready to use for our experiment</p>
36    <p>Here is a picture of a similar volcano made out of plasticine!
```

- Copy and paste the basic structure of a web page from Thimble Editor to Adobe Brackets. Discuss the structure of this page and ask the pupils to summarise the tags they've learned so far. Ensure they've got a good grasp of the `...` tag for making links.
- Show the pupils how to save their pages and open them in a web browser. Also show them how to refresh the page in their browser to see the effects of any changes they make. Brackets connects directly with Google Chrome, although the pages the pupils create can be viewed in any browser, by saving in Brackets and refreshing the page in the browser.
- It might be useful for the pupils to work in pairs or small groups for this lesson. Brief them on the topic for their web page – maybe a topic they're studying in another subject.
- Ask the pupils to brainstorm ideas about what they'll include on their web page and how they'll structure it. They should create the overall structure of their page using `<h1>...</h1>`, `<h2>...</h2>`, etc. to create headings and subheadings.
- Encourage the pupils to research their topic using the web, taking notes from the pages they use and, crucially, copying down the URLs of the pages they visit. Use questioning to check the pupils' understanding of how URLs are structured and the role they play in making the web possible.
- Ask the pupils to use their notes to add content to their page, using `<p>...</p>` tags for their paragraphs. Ask them to add links to show where their information has come from, using the `...` anchor tag. (Again, if necessary, remind children that they need to include 'http://' at the beginning of URLs.)

Extensions

SCHOOL

- Some pupils might like to experiment with formatting in HTML, such as using `` for bold or `` for italic.

HOME

- The pupils could continue research for their web pages, looking for images and video to embed in the next step. They only need to note down the addresses at this stage.

Step 6: Developing and refining

RESOURCES



- Pupil self-assessment information



- Google Advanced Image Search: www.google.co.uk/advanced_image_search
- Google Drive for hosting: <https://support.google.com/drive/answer/2881970?hl=en>
- YouTube Education: www.youtube.com/education
- TED: www.ted.com

POSSIBLE OUTCOME FOR THIS STEP:

Science experiment

By Hannah and Adina

In this web page we are going to show you how we created a working volcano!

We started by collecting the ingredients to build our volcano structure! These ingredients were:

- newspaper
- flour
- water
- a bowl
- chicken wire
- paint
- PVA glue

Our project also helped us think like algorithms because we had a list of ingredients and then had to

We then made the volcano like this:

1. shaped the chicken wire into a volcano shape (a bit like a mountain)
2. mixed the water and flour together to make a paste
3. Ripped up pieces of newspaper

- Ask the pupils to review the progress they've made on their web pages and complete work on the text, remembering to add links to the source of any information they use so their readers can find out more about topics.
- Ask the pupils to demonstrate how to add an image to a web page using the `` tag.
- Show them how to add height or width attributes to the tag to ensure the image is shown at an appropriate size, e.g. ``. Remind the pupils to use Creative Commons licensed images, and to include a link to the page the image came from. Model how to do this using Google Advanced Image Search, and then ask the pupils to add appropriate images to their web page.
- Consider showing the pupils how to add a video from a video sharing site such as YouTube Education or TED (see *Resources*). To add a video to a web page, use the `<iframe src="..."> </iframe>` tags given in the 'embed' code on the video sharing site. Explain that these tags effectively create a hole in one website through which another one can be seen. Pupils might like to experiment with changing the attributes for these tags.
- Ask the pupils to proofread their own and each other's web pages, making any necessary changes.
- Depending on school policy, the pupils could publish their web pages on the web, or share the contents of their pages on the school learning platform or their blog. Web pages can be published free on Google Drive (see *Resources*) or on Thimble, if you have an account.

SCHOOL

- Some pupils might like to explore the formatting options available in HTML through CSS and the use of other tags and attributes.

HOME

- Ask the pupils to write up a summary of what they've learned during the unit for their blog, including links to their sites, if published, screenshots or snippets of the code itself.

Assessment guidance

Use this page to assess the children's computing knowledge and skills. You may wish to use these statements in conjunction with the badges provided on the CD-ROM or community site and/or with your own school policy for assessing work.

ALL CHILDREN SHOULD BE ABLE TO:

- Understand the difference between the web and the internet
- Understand that web pages are written and transmitted in HTML
- Know and use some simple HTML tags
- Edit the HTML for a web page
- Create web pages that do not reveal pupils' personal information

BADGE



COMPUTING PoS REFERENCE

- Understand computer networks including the internet
- Understand how computer networks provide the world wide web
- Use a variety of software (including internet services) to present information
- Use a variety of software (including internet services) to present information
- Use technology safely, respectfully and responsibly

MOST CHILDREN WILL BE ABLE TO:

- Explain the parts of a URL
- Recognise the importance of links for the web
- Use the `...` tag correctly to insert a link
- Create a web page by writing HTML
- Create web pages that show due regard for safety and responsibility



- Understand how computer networks provide the world wide web
- Understand how computer networks provide the world wide web
- Use a variety of software (including internet services) to present information
- Use a variety of software (including internet services) to present information
- Use technology safely, respectfully and responsibly

SOME CHILDREN WILL BE ABLE TO:

- Show some understanding of HTTP
- Be aware of the history of the web
- Use `` and `<iframe>...</iframe>` tags effectively



- Understand computer networks including the internet
- Understand how computer networks provide the world wide web
- Use a variety of software (including internet services) to present information

PROGRESSION

The following units will allow your children to develop their knowledge and skills further.

- Unit 4.5 – We are co-authors*
- Unit 5.4 – We are web developers*

5

Classroom ideas

Practical suggestions to bring this unit alive!



DISPLAYS AND ACTIVITIES

- You could create a display with the pupils' HTML code on one side and their rendered web pages on the other.
- The pupils could make a display to show the anatomy of a URL or explain what happens when a browser requests a page.
- The pupils could make a display of HTML tags and their meaning.



WEBLINKS

- Tim Berners-Lee's original proposal for the web: <http://info.cern.ch/Proposal.html>.
- Tim Berners-Lee's Answers for Young People is highly recommended: www.w3.org/People/Berners-Lee/Kids.html.
- It's possible to use HTML as a tool for presentations. See <http://paulrouget.com/dzslides> for one example.
- HTML5 is the latest version of the standard. See <http://diveintohtml5.info> for an introduction.
- An interactive history of the web: <http://webdirections.org/history>.
- The Internet Archive's Wayback Machine allows you to (re)visit old versions of most websites: <http://archive.org/web/web.php>.



VISITS

- You could arrange a visit to (or from) a local web-design studio.
- If your school website is professionally produced, one of the designers might be willing to visit the school to talk about their work.
- Pupils who are particularly interested in this work might like to sign up for Young Rewired State's Festival of Code in the summer holidays: <http://youngrewiredstate.org>.
- Decoded offer free courses in HTML coding for state schools. See <http://decoded.co.uk/codeED-in-a-day>.



BOOKS

- Berners-Lee, T. *Weaving the Web: The Past, Present and Future of the World Wide Web by its Inventor*. (Orion Business, 1999)
- Duckett, J. *HTML & CSS: Design and Build Web Sites*. (John Wiley and Sons, 2011)
- Gillies, J. and Cailliau, R. *How the Web Was Born: The Story of the World Wide Web*. (Oxford Paperbacks, 2000)
- Pedersen, T. and Moss, F. *Make Your Own Web Page!: A Guide for Kids*. (Price Stern Sloan Publishers Inc. U.S, 2000)
- Selfridge, B. and Selfridge, P. *A Kid's Guide to Creating Web Pages for Home and School*. (Zephyr Press, 2004)

6

Taking it further

When you've finished, you might want to extend the project in the following ways.

- This unit leads directly into *Unit 4.5, We are co-authors*.
- The content of the pupils' projects as they're learning HTML, and for their final web page, can be linked to any area of the curriculum: science, history, geography, RE and PSHE would all work effectively.
- There are many opportunities for the pupils to write for the web across the curriculum. They could code some of these pages in HTML.
- Consider turning off the WYSIWYG editor in the blogging software or learning platform your pupils use, or encourage them to use the HTML view option in it.
- Markdown is a simple, plain text approach to marking up a document that converts readily into HTML, and is supported by growing numbers of text editors and websites.
- Encourage the pupils to use the page source view command in their browser from time to time, particularly when they visit well-designed websites.
- The activities in this unit work well without having to upload the pupils' web pages to a web server, but you could set up your own dedicated web server if you have a spare computer. There are instructions at <http://arstechnica.com/gadgets/2012/11/how-to-set-up-a-safe-and-secure-web-server>.