



## Higher National Unit specification

### General information

**Unit title:** Web Technologies 2: HTML, CSS and JavaScript  
(SCQF level 8)

**Unit code:** HF3M 35

**Superclass:** CB

**Publication date:** June 2016

**Source:** Scottish Qualifications Authority

**Version:** 01

### Unit purpose

The purpose of this Unit is to enable learners to develop their skills in the use of a variety of web technologies to create accessible, interactive, and responsive websites. This Unit is suitable for those who already have knowledge of Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and responsive design techniques but want to learn more about the latest generation of browser based technologies. This Unit may also be beneficial to programmers who may want to expand their skills in front-end development.

This Unit includes researching and implementing techniques to make web content dynamic and responsive. It also includes the use of editors, libraries and Application Programming Interfaces (APIs) for development.

On completion of this Unit the learner will be able to build interactive websites that are aesthetically pleasing with content that is easily displayed and accessible on a variety of browsers and devices.

### Outcomes

On successful completion of the Unit the learner will be able to:

- 1 Develop an interactive website using HTML, CSS and JavaScript.
- 2 Expand the functionality of the site making use of libraries, APIs, and scripts.
- 3 Enhance the user experience by making use of advanced CSS and HTML.

## Higher National Unit specification: General information (cont)

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### Credit points and level

1 Higher National Unit credit at SCQF level 8: (8 SCQF credit points at SCQF level 8)

### Recommended entry to the Unit

Access to this Unit is at the discretion of the centre. However, it is recommended that learners complete the Unit HF3K 35 *Web Technologies 1: HTML and CSS*, and H173 34 *Developing Software: Introduction* before beginning this Unit. They should have previous experience of using JavaScript.

### Core Skills

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

### Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

The Assessment Support Pack (ASP) for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website (<http://www.sqa.org.uk/sqa/46233.2769.html>).

### Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements).

## Higher National Unit specification: Statement of standards

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

### Outcome 1

Develop an interactive website using HTML, CSS and JavaScript.

#### Knowledge and/or Skills

- ◆ HTML tags, elements and attributes
- ◆ CSS rules, selectors and properties
- ◆ JavaScript objects, properties, methods and events
- ◆ JavaScript and HTML Document Object Model(DOM)
- ◆ DOM Programming Interface
- ◆ Well-structured and easily maintainable code

### Outcome 2

Expand the functionality of the site making use of libraries, APIs, and scripts.

#### Knowledge and/or Skills

- ◆ Common HTML Application Programming Interfaces (APIs)
- ◆ JavaScript APIs
- ◆ Libraries

### Outcome 3

Enhance the user experience by making use of advanced CSS and HTML.

#### Knowledge and/or Skills

- ◆ CSS for responsive sites that can adapt to different devices
- ◆ CSS for a variety of effects to enhance the user experience
- ◆ HTML Graphics

## Higher National Unit specification: Statement of standards (cont)

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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### Evidence Requirements for this Unit

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills across all Outcomes.

The Evidence Requirements for this Unit will only take one form — Evidence of practical competence (practical abilities) for all Outcomes.

Candidates will need to provide evidence to demonstrate that they will be able to:

- ◆ Develop an interactive web site using HTML, CSS and JavaScript, including:
  - Use HTML tags, elements and attributes
  - Use CSS rules, selectors and properties
  - Use JavaScript objects, properties, methods and events
  - Use JavaScript and HTML Document Object Model(DOM)
  - Use DOM Programming Interface
  - Create Well-structured and easily maintainable code
- ◆ Expand the functionality of the site making use of libraries, APIs, and scripts, including:
  - Use common HTML APIs
  - Use JavaScript Application Programming Interfaces
  - Use Libraries
- ◆ Enhance the user experience by making use of advanced CSS and HTML, including:
  - Use CSS for responsive sites that can adapt to different devices
  - Use CSS for a variety of effects to enhance the user experience
  - Add graphics using HTML Graphics

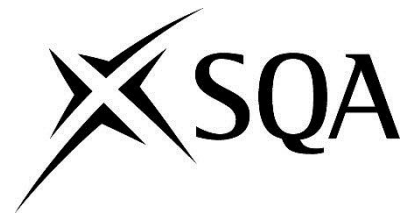
It is recommended that all Outcomes are assessed together in a holistic manner.

The candidate should be able to choose which development tools they wish to use to best suit the needs and objectives of their site. A template may be used but it must be changed and adapted to a significant degree so that the site is unique.

The quality of the final product must be aesthetically pleasing and technically competent. The scope of the project should be limited to no more than seven main menu items in order for it to be completed within the 40 hour timescale. A checklist should be implemented to ensure candidates have utilised all items in the Evidence Requirements.

Evidence of practical competence may be produced over an extended period of time under open-book conditions. Evidence may be wholly or partly produced under controlled conditions. When evidence is produced in uncontrolled or loosely controlled conditions it must be authenticated.

The Guidelines on Approaches to Assessment (see the Support Notes section of this specification) provides further advice on methods of authentication.



## Higher National Unit Support Notes

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

### Guidance on the content and context for this Unit

At the time of writing, this is a mandatory Unit in the HND Web Development framework. It may also be taken as a standalone Unit in other computing frameworks. It is intended for those who want to develop their skills in web technologies and apply various techniques to make websites interactive, accessible and responsive.

HTML, CSS and JavaScript have survived many iterations and changes as technology has evolved and it is essential to know these languages with confidence in order to use web development frameworks, develop mobile apps and develop apps for the Internet of Things.

The Unit allows learners to progress with the development of web pages adding HTML, CSS, JavaScript, use APIs and libraries and use facilities available within editing software. The content of this Unit is essential for those who wish to be a web professional.

Possible content to include in this Unit is vast, therefore the list suggested here is not exhaustive. Tutors should allow time for individual learners investigation of the features of CSS and HTML they want to implement. Guidance maybe necessary to limit the scope of the project and to guard against endless possibilities in design. If a brief is issued, it should be as prescriptive as possible whilst still allowing some creativity to evolve for both design and functionality.

### Outcome 1

This Outcome covers the development of the website using HTML, JavaScript and CSS. The aim would be for the website to make use of sufficiently complex code to demonstrate a level of improvement in the learner's knowledge and skills from previous web Units they may have completed at an earlier stage. The website should employ current technologies and allow learner's to be creative and to experiment with new techniques.

## Higher National Unit Support Notes (cont)

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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**Use HTML tags, elements and attributes** — at a minimum the following should be covered:

- ◆ Common structural elements including div, main, section, article, nav, header, aside, footer, main, and menuitem
- ◆ Form elements, a variety of input types and attributes
- ◆ Common attributes id, class, and event attributes

This list is not exhaustive and it is not required that learners implement all of these in the one website, however it is important that they are aware of and can use a wide variety of them.

At the time of writing a current list of HTML tags, elements and attributes can be found here:

<http://www.w3schools.com/tags/default.asp>  
[http://www.w3schools.com/html/html5\\_new\\_elements.asp](http://www.w3schools.com/html/html5_new_elements.asp)  
[http://www.w3schools.com/html/html5\\_semantic\\_elements.asp](http://www.w3schools.com/html/html5_semantic_elements.asp)  
[http://www.w3schools.com/tags/ref\\_standardattributes.asp](http://www.w3schools.com/tags/ref_standardattributes.asp)  
[http://www.w3schools.com/html/html\\_attributes.asp](http://www.w3schools.com/html/html_attributes.asp)

**Use CSS rules, selectors and properties** — at a minimum the following should be covered:

- ◆ Common CSS styles for positioning, layout and formatting including Box Sizing and Flexbox
- ◆ CSS for special effects, eg Rounded Corners, Gradients, Shadows, Animations, and Transform
- ◆ CSS Media Queries

This list is not exhaustive and it is not required that learners implement all of these in the one website, however it is important that they are aware of and can use a wide variety of them. It is imperative that content delivered within this Unit is current.

[http://www.w3schools.com/css/css3\\_intro.asp](http://www.w3schools.com/css/css3_intro.asp)

**Use JavaScript objects, properties, methods and events** — at least the following should be covered:

- ◆ Basic understanding of the language to enable the learners to create a page that will react to common events such as page loads, mouse clicks and movements, and keyboard input.
- ◆ Use JavaScript to access HTML elements in an HTML page, eg validate input, change the style of an HTML element, change HTML attributes, validate data, use functions and events appropriate to the purpose of the website, use string, date and number methods.

## Higher National Unit Support Notes (cont)

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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**JavaScript and HTML Document Object Model(DOM) and the DOM Programming Interface** — at least the following should be covered:

- ◆ DOM Tree (Hierarchy)
- ◆ How the Document Object Model (DOM) is used by JavaScript to identify and modify specific parts an HTML document:
  - Finding HTML elements using different methods, ie by id, class, tag name and CSS selectors:
    - HTML elements as objects
    - Properties of all HTML elements
    - Methods to access all HTML elements
    - Events for all HTML elements
  - Use the getElementById method
  - Use the innerHTML property
- ◆ Use any variety of other methods appropriate to the purpose of the website:
  - DOM nodes:
    - Document
    - Element
    - Attribute
  - An awareness of the w3c DOM standards
  - An awareness that implementation of the DOM applies to any language not just JavaScript

**Well-structured and easily maintainable code** — code should be efficient and well commented and functional on more than one browser.

<https://www.w3.org/standards/webdesign/script>  
[https://www.w3.org/standards/techs/dom#w3c\\_all](https://www.w3.org/standards/techs/dom#w3c_all)

It is unlikely that Outcomes would be separated into the content for each, there will be overlap and a logical flow between structure and design. There are many variations in browser capabilities when implementing some features of HTML and CSS; the learners should develop an awareness of this and use iterative testing as they progress with development.

## Higher National Unit Support Notes (cont)

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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### Outcome 2

As learners develop their websites to be interactive and responsive they will have the opportunity to apply the knowledge and skills for this Outcome.

**Use common HTML APIs** — Learners should become aware of the variety of APIs, and use one or more of them as appropriate, suggestions could include:

- ◆ Geolocation
- ◆ Drag and Drop
- ◆ Local storage
- ◆ History
- ◆ Any other relevant to the site

### Use JavaScript Application Programming Interfaces such as Google Maps:

There are many APIs that could be used; currently Gmaps.js is another geolocation tool that the learner could use. The learner should use at least one API relevant to the purpose of their site.

### Use Libraries, eg jQuery:

jQuery is probably the best and most useful library at the time of writing, however there are other libraries that the learner might use if appropriate to their site's purpose. Some other examples currently in use are React.js, Modernizr and MooTools. The learner can use jQuery or another library, to make their code more efficient or to achieve a specific task. For this Outcome the learner should make use of one library on one or more occasions to enhance the functionality of their website.

Simple examples could be any of the following:

- ◆ Animate an object
- ◆ Use hide and show effects within a page
- ◆ Use mouse effects
- ◆ Use hover effects



## Higher National Unit Support Notes (cont)

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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### Outcome 3

This Outcome is about making the user experience more enjoyable and interesting. It is also about ensuring that the site is responsive over different devices.

- ◆ Use CSS for responsive sites that will adapt for different devices:
  - Current methods for responsive websites. At the time of writing the following methods are used:
    - meta tag for viewport
    - grid systems and frameworks
    - media queries for various breakpoints
    - using % measurements
  - ensure images re-size on different devices

It is of utmost importance the current methods are taught and the learner has the benefit of using up-to-date web technologies. Mobile design first is the recommended approach to responsive design.

- ◆ Use CSS for a variety of effects to enhance the user experience, examples that could be used include gradients, backgrounds, animations, transitions, rounded corners, images, colors. The learner should apply a suitable variety of these enhancements as appropriate to the design of their site.
- ◆ Add graphics using HTML Graphics which includes the use of canvas and scalable vector graphics (SVG).
- ◆ Use responsive methods for both canvas and SVG to create graphics such as a logo or shaped objects as appropriate to the design of the website. Create Responsive Menus which displays well on handheld devices such as tablets and mobile phones — a suggestion would be to cater for a change in the orientation to landscape, add appropriate breakpoints to design for a number of screen widths, or add or remove logos/icons at different screen widths.

A holistic approach to content and context is essential as many areas would be developed simultaneously. The learners will also be learning about items such as APIs, browser issues, as they progress through the development of the website.

There are opportunities to develop aspects of computational thinking throughout this Unit.

Learners are expected to build a website which involves breaking a complex task down into a series of smaller tasks. When problems arise they are likely to be related to other problems previously solved. In addition a solution to a problem may solve a range of related problems.

## Higher National Unit Support Notes (cont)

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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### Guidance on approaches to delivery of this Unit

This Unit has can be delivered as a stand-alone Unit. If this Unit is being delivered as part of the HND Web Development it could also be delivered in conjunction with HF3D 35 *Designing and Developing and Interactive Product*.

Practical work using task based exercises could be used to instruct on the use of some features of HTML, CSS, JavaScript and media queries which may be new to the learner. Tutors could begin by guiding students to investigate some HTML features using case studies and tutorial sites, then practice implementing them as completion exercises. Tutors can encourage learners to use the developer mode available in some browsers to instantly view mobile phone layout and to highlight and demonstrate aspects of code, styles, and box layouts present on any chosen case study sites.

Explanations of media queries, responsive design, libraries and APIs should be given in the form of lectures, presentations, online quizzes, case study analysis and short investigative learner-centred exercises.

The learners should already have knowledge of HTML and also client side scripting from previous Units, therefore the tutor should not have to teach basic JavaScript programming but rather focus on its use with libraries such as jquery or others.

A holistic approach will be essential in the delivery of this Unit with responsive design being the main focus of current web development techniques. There are a large amount of sites that could be investigated to assist with developing responsive designs, and students should be directed to suitable and informative resources.

Possible content to teach in this subject area is vast, since CSS has so many possibilities. Tutors should keep realistic goals on what to cover and what can be implemented in the time allocated. A learner-centred approach is necessary, where the learner investigates techniques and aspects they wish to implement by themselves and can thereby add to their list of resources for use in the future.

Tutors should ensure that they have covered sufficient technologies and features to enable the learner to implement a responsive website.

Some useful online resources for delivery of this Unit are:

- ◆ Sitepoint <http://www.sitepoint.com/> which can help with examples of more complex code, APIs, media queries and many other useful tools the learner may wish to investigate
- ◆ W3C schools, a tutorial site covering HTML, CSS, JavaScript, jQuery and more <http://www.w3schools.com/>
- ◆ Responsive design, a knowledge hub <https://responsivedesign.is/>
- ◆ To check responsiveness this site may be useful <http://ami.responsivedesign.is/> or <http://www.isresponsive.com/>
- ◆ Google developers site has a wide range of information and tutorials <https://developers.google.com/>
- ◆ An awards site which highlights good responsive designs <http://www.awwwards.com/>

## Higher National Unit Support Notes (cont)

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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### Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to candidates.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

A holistic approach for all Outcomes could be taken where the candidate is aware of the need for a responsive design solution. A checklist covering all of the Evidence Requirements could be used to ensure the candidate has completed all of the work.

The assessment is open-book where the candidate can refer to notes and previously completed exercises. Candidates should work at their own pace but in a supervised environment where the tutor can be assured of the authenticity of work produced.

The tutor will supply the candidate with a project brief, and a design specification. This should give a good indication of how the site should function on a variety of devices, however at this level there could be elements of choice. The candidate should be encouraged to access and research a range of resources and implement elements of choice for the design and functionality to make their site unique for display on a variety of devices. It may be beneficial that this Unit is assessed with another Unit that requires the candidate to produce a requirements and design document.

Possible examples of a project brief could be:

- ◆ a photographic or art portfolio site
- ◆ a site for a small business promoting their services
- ◆ a travel information site of local bars, restaurants and tourist information
- ◆ an educational site using a variety of methods to display information
- ◆ a health and fitness site

The project website should be of manageable size for the time allocated to this Unit. Therefore, the content does not need to be extensive but sufficient to demonstrate skills acquired.

If this Unit is being delivered as part of the HND Web Development it could also be assessed in conjunction with HF3D 35 Designing and Developing and Interactive Product.

## Higher National Unit Support Notes (cont)

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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### Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at [www.sqa.org.uk/e-assessment](http://www.sqa.org.uk/e-assessment).

### Opportunities for developing Core and other essential skills

The skills in HTML, CSS and JavaScript coding developed in this Unit are essential for employment as a professional web developer.

The Core Skill of *Problem Solving* is developed throughout this Unit, the evidence produced for all Outcomes is the final design solution created from basic text files.

Throughout the Unit learners will be expected to use *Information and Communication Technology (ICT)*. They will be required to use the internet for research, and they will be creating web pages using a text editor and web browsers.

There are also opportunities for developing the Using Number skills required for the *Numeracy* Core Skill at SCQF level 5. Learners will be expected to use numerical skills to solve real-life problems involving measurement when perform calculations for responsive design and breakpoints involving percentages and interface layout using ratios.

## History of changes to Unit

Version	Description of change	Date

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## General information for learners

**Unit title:** Web Technologies 2 HTML, CSS and JavaScript  
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This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit has been devised to help you to further develop your skills in web development using Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript. This is essential for employment as a web developer or designer.

HTML, CSS and JavaScript have survived many iterations and changes as technology has evolved and it is essential to know these languages and be able to use them with confidence in order to work with web development frameworks, develop mobile apps and develop apps for the Internet of Things.

This Unit assumes that you have already successfully completed the HF3K 34 *Web Technologies 1: HTML and CSS* Unit or have basic skills in HTML and CSS. Before attempting this Unit you should have also completed a Unit that introduces you to JavaScript or have basic skills in coding in JavaScript. If you have successfully completed the Unit H173 34 *Developing Software: Introduction* and it was taught using JavaScript, this will be beneficial.

In this Unit you will investigate and learn to apply current and more advanced features available in HTML, CSS and JavaScript and you will make use libraries such as jQuery and Application Programming Interfaces (APIs). This will enable you to develop interactive and responsive websites that focus on giving the end user a great user experience. You will be encouraged to continually keep up to date with web technologies which is crucial if you wish to succeed in the web development industry.

You may be required to complete at least one practical assessment which involves a project during this Unit. For this task you will be given set of website requirements and design instructions and from these you will code a fully interactive and responsive website.

The skills in HTML, CSS and JavaScript coding developed in this Unit are essential for employment as a professional web developer.

There are opportunities for you to develop the Core Skills of *Problem Solving, Numeracy and Information and Communication Technology (ICT)*.