

# **HTML5**

**for Masterminds**

**J.D. Gauchat**

[www.jdgauchat.com](http://www.jdgauchat.com)

Edited by: **Jessie Colgan**

[www.talksciencetome.com](http://www.talksciencetome.com)

# Table of Contents

## Chapter 1—HTML5 Documents

<b>1.1 Basic Components</b>	<b>1</b>
<b>1.2 A Brief Introduction to HTML</b>	<b>1</b>
<i>Tags and Elements</i>	2
<i>Attributes</i>	3
<i>Traditional Elements</i>	4
<b>1.3 Global Structure</b>	<b>4</b>
<!DOCTYPE>	4
<html>	5
<head>	5
<body>	6
<meta>	6
<title>	7
<link>	8
<b>1.4 Body Structure</b>	<b>9</b>
<i>Organization</i>	9
<header>	12
<nav>	13
<section>	14
<aside>	15
<footer>	16
<b>1.5 Deep Inside the Body</b>	<b>17</b>
<article>	18
<hgroup>	21
<figure> and <figcaption>	23
<details> and <summary>	24
<b>1.6 New and Old Elements</b>	<b>25</b>
<mark>	25
<small>	25
<cite>	26
<address>	26
<wbr>	26
<time>	27
<data>	27
<b>1.7 New and Old Attributes</b>	<b>28</b>
<i>The data-* Attribute</i>	28
<i>Reversed</i>	28
<i>Ping and Download</i>	29
<i>Translate</i>	29
<i>Contenteditable</i>	30
<i>Spellcheck</i>	30

## Chapter 2—CSS Styling and Box Models

<b>2.1 CSS and HTML</b>	<b>31</b>
<b>2.2 A Brief Introduction to CSS</b>	<b>31</b>
<i>CSS Rules</i>	32
<i>Properties</i>	33
<i>Inline Styles</i>	34
<i>Embedded Styles</i>	35
<i>External Files</i>	35
<i>References</i>	36
<i>Referencing by Keyword</i>	37
<i>Referencing by the Id Attribute</i>	37
<i>Referencing by the Class Attribute</i>	38
<i>Referencing by Any Attribute</i>	39
<i>Referencing by Pseudo-Classes</i>	40
<i>New Selectors</i>	43
<b>2.3 Applying CSS to Our Document</b>	<b>44</b>
<i>Box Models</i>	45
<b>2.4 Traditional Box Model</b>	<b>46</b>
<i>HTML Document</i>	46
<i>Universal Selector *</i>	48
<i>Headings</i>	48
<i>Declaring New HTML5 Elements</i>	49
<i>Centering the Body</i>	49
<i>Creating the Main Box</i>	50
<i>The Header</i>	51
<i>Navigation Bar</i>	51
<i>Section and Aside</i>	52
<i>Footer</i>	53
<i>Finishing Touches</i>	55
<i>Box-Sizing</i>	56
<b>2.5 Flexible Box Model</b>	<b>57</b>
<i>Flex Container</i>	58
<i>HTML Document</i>	58
<i>Display</i>	59
<i>Axes</i>	59
<i>Flex Property</i>	60
<i>Flex-Direction</i>	64
<i>Order</i>	65
<i>Justify Content</i>	66
<i>Align-Items</i>	68
<i>Align-Self</i>	71
<i>Flex-Wrap</i>	71
<i>Align Content</i>	73
<b>Chapter 3—CSS3 Properties</b>	
<b>3.1 The New Rules</b>	<b>77</b>
<i>CSS3 Goes Crazy</i>	77
<i>HTML Document</i>	78

<i>Border-Radius</i>	79
<i>Box-Shadow</i>	81
<i>Text-Shadow</i>	83
<i>@font-face</i>	84
<i>Linear Gradient</i>	85
<i>Radial Gradient</i>	88
<i>RGBA</i>	89
<i>HSLA</i>	89
<i>Outline</i>	90
<i>Border-Image</i>	91
<i>Background</i>	92
<i>Columns</i>	94
<i>Filters</i>	95
<b>3.2 Transform</b>	<b>96</b>
<i>Transform: Scale</i>	96
<i>Transform: Rotate</i>	97
<i>Transform: Skew</i>	98
<i>Transform: Translate</i>	98
<i>Transforming All at Once</i>	99
<i>Dynamic Transformations</i>	100
<i>3D Transformations</i>	100
<b>3.3 Transitions</b>	<b>103</b>
<b>3.4 Animations</b>	<b>104</b>
<b>Chapter 4—Javascript</b>	
<b>4.1 A Brief Introduction to Javascript</b>	<b>107</b>
<i>The Language</i>	108
<i>Variables</i>	108
<i>Conditionals and Loops</i>	112
<i>Functions and Anonymous Functions</i>	115
<i>Objects</i>	118
<i>Constructors</i>	126
<i>The Window Object</i>	128
<i>The Document Object</i>	129
<b>4.2 An Introduction to Events</b>	<b>129</b>
<i>Event Attributes</i>	130
<i>Event Properties</i>	130
<i>The AddEventListener() Method</i>	131
<b>4.3 Incorporating Javascript</b>	<b>131</b>
<i>Inline</i>	131
<i>Embedded</i>	132
<i>External File</i>	133
<b>4.4 New Selectors</b>	<b>134</b>
<i>querySelector()</i>	135
<i>querySelectorAll()</i>	135
<i>matchesSelector()</i>	137
<b>4.5 Interacting with the Document</b>	<b>137</b>
<i>Javascript Styles</i>	138

<i>Classlist</i>	139
<i>Accessing Attributes</i>	141
<i>Dataset</i>	141
<i>Create and Erase Elements</i>	142
<i>InnerHTML, OuterHTML and InsertAdjacentHTML</i>	143
<b>4.6 APIs</b>	<b>145</b>
<i>Native APIs</i>	145
<i>External APIs</i>	145
<b>4.7 Errors and Debugging</b>	<b>146</b>
<i>Console</i>	146
<i>console.log()</i>	147
<i>Error Event</i>	148
<b>Chapter 5—Forms and Forms API</b>	
<b>5.1 HTML Forms</b>	<b>151</b>
<i>The &lt;form&gt; Element</i>	151
<i>The &lt;input&gt; Element</i>	152
<i>More Form Elements</i>	154
<i>Form Submit</i>	155
<b>5.2 New Input Types</b>	<b>155</b>
<i>Email Type</i>	156
<i>Search Type</i>	156
<i>URL Type</i>	156
<i>Tel Type</i>	157
<i>Number Type</i>	157
<i>Range Type</i>	157
<i>Date Type</i>	158
<i>Week Type</i>	158
<i>Month Type</i>	158
<i>Time Type</i>	158
<i>Datetime Type</i>	159
<i>Datetime-local Type</i>	159
<i>Color Type</i>	159
<b>5.3 New Attributes</b>	<b>159</b>
<i>Autocomplete Attribute</i>	160
<i>Novalidate and Formnovalidate Attributes</i>	160
<i>Placeholder Attribute</i>	160
<i>Required Attribute</i>	161
<i>Multiple Attribute</i>	161
<i>Autofocus Attribute</i>	161
<i>Pattern Attribute</i>	162
<i>Form Attribute</i>	162
<b>5.4 New Form Elements</b>	<b>163</b>
<i>The &lt;datalist&gt; Element</i>	163
<i>The &lt;progress&gt; Element</i>	163
<i>The &lt;meter&gt; Element</i>	163
<i>The &lt;output&gt; Element</i>	164

<b>5.5 New Pseudo-Classes</b>	<b>164</b>
<i>Valid and Invalid</i>	164
<i>Optional and Required</i>	165
<i>In-range and Out-of-range</i>	166
<b>5.6 Forms API</b>	<b>166</b>
<i>SetCustomValidity()</i>	167
<i>The Invalid Event and the CheckValidity() Method</i>	168
<i>Real-Time Validation with ValidityState</i>	170
<i>Validity Constraints</i>	172
<b>Chapter 6—Video and Audio</b>	
<b>6.1 Video with HTML5</b>	<b>175</b>
<i>The &lt;video&gt; Element</i>	176
<i>Attributes for the &lt;video&gt; Element</i>	177
<i>Video Formats</i>	178
<b>6.2 Audio with HTML5</b>	<b>178</b>
<i>The &lt;audio&gt; Element</i>	179
<b>6.3 Closed Captioning</b>	<b>180</b>
<i>The &lt;track&gt; Element</i>	180
<b>6.4 Programming a Media Player</b>	<b>184</b>
<i>Designing a Video Player</i>	184
<i>Application</i>	186
<i>Events</i>	187
<i>Script</i>	187
<i>Methods</i>	188
<i>Properties</i>	189
<i>Code at Work</i>	189
<b>Chapter 7—Text Track API</b>	
<b>7.1 TextTrack API</b>	<b>193</b>
<i>Reading Tracks</i>	194
<i>Reading Cues</i>	195
<i>Adding New Tracks</i>	196
<b>Chapter 8—Fullscreen API</b>	
<b>8.1 No More Windows</b>	<b>199</b>
<i>Going Fullscreen</i>	199
<i>Fullscreen Styles</i>	201
<b>Chapter 9—Stream API</b>	
<b>9.1 Capturing Media</b>	<b>203</b>
<i>Accessing the Webcam</i>	203
<i>MediaStreamTrack objects</i>	205
<i>Stop() Method</i>	206
<b>Chapter 10—Canvas API</b>	
<b>10.1 Graphics for the Web</b>	<b>209</b>
<i>The &lt;canvas&gt; Element</i>	209
<i>getContext()</i>	210

<b>10.2 Drawing on Canvas</b>	<b>210</b>
<i>Drawing Rectangles</i>	210
<i>Colors</i>	212
<i>Gradients</i>	212
<i>Creating Paths</i>	214
<i>Line Styles</i>	220
<i>Text</i>	222
<i>Shadows</i>	224
<i>Transformations</i>	224
<i>Restoring Status</i>	227
<i>GlobalCompositeOperation</i>	228
<b>10.3 Processing Images</b>	<b>229</b>
<i>DrawImage(j)</i>	229
<i>Image Data</i>	231
<i>Cross-Origin</i>	233
<i>Extracting Data</i>	235
<i>Patterns</i>	235
<b>10.4 Animations on Canvas</b>	<b>236</b>
<i>Elemental Animations</i>	236
<i>Professional Animations</i>	238
<b>10.5 Processing Video on Canvas</b>	<b>241</b>
<i>Video on Canvas</i>	242
<i>Real Life Application</i>	243
<b>Chapter 11—WebGL and Three.js</b>	
<b>11.1 Canvas in 3D</b>	<b>245</b>
<b>11.2 Three.js</b>	<b>245</b>
<i>Renderer</i>	246
<i>Scene</i>	247
<i>Camera</i>	248
<i>Meshes</i>	248
<i>Geometric Primitives</i>	249
<i>Materials</i>	250
<i>Implementation</i>	253
<i>Transformations</i>	255
<i>Lights</i>	256
<i>Textures</i>	258
<i>UV Mapping</i>	260
<i>Canvas Textures</i>	262
<i>Video Textures</i>	264
<i>Loading 3D Models</i>	266
<i>3D Animations</i>	268
<b>Chapter 12—Pointer Lock API</b>	
<b>12.1 New Mouse Pointer</b>	<b>281</b>
<i>Mouse Capture</i>	281
<i>PointerLockElement</i>	282
<i>MovementX and MovementY</i>	283

## **Chapter 13—Drag and Drop API**

<b>13.1 Drag and Drop for the Web</b>	<b>287</b>
<i>Events</i>	287
<i>DataTransfer</i>	290
<i>Dragenter, Dragleave and Dragend</i>	291
<i>Selecting a Valid Source</i>	292
<i>SetDragImage()</i>	294
<i>Files</i>	295

## **Chapter 14—Web Storage API**

<b>14.1 Two Storage Systems</b>	<b>299</b>
<b>14.2 sessionStorage</b>	<b>300</b>
<i>Data Storage Implementation</i>	300
<i>Creating Data</i>	301
<i>Reading Data</i>	303
<i>Deleting Data</i>	304
<b>14.3 localStorage</b>	<b>305</b>
<i>Storage Event</i>	306

## **Chapter 15—IndexedDB API**

<b>15.1 Structuring Data</b>	<b>309</b>
<i>Database</i>	309
<i>Objects and Object Stores</i>	310
<i>Indexes</i>	311
<i>Transactions</i>	311
<i>Object Stores' Methods</i>	312
<b>15.2 Implementing IndexedDB</b>	<b>312</b>
<i>HTML Document</i>	313
<i>Opening the Database</i>	314
<i>Object Stores and Indexes</i>	315
<i>Adding Objects</i>	316
<i>Getting Objects</i>	317
<i>Finishing the Code and Testing</i>	317
<b>15.3 Listing Data</b>	<b>318</b>
<i>Cursors</i>	318
<i>Changing Order</i>	320
<b>15.4 Deleting Data</b>	<b>321</b>
<b>15.5 Searching Data</b>	<b>322</b>

## **Chapter 16—File API**

<b>16.1 File Storage</b>	<b>325</b>
<b>16.2 Processing the User's Files</b>	<b>325</b>
<i>HTML Document</i>	326
<i>Reading Files</i>	327
<i>File Properties</i>	328
<i>Blobs</i>	329
<i>Events</i>	331



<b>16.3 Creating Files</b>	<b>332</b>
<i>HTML Document</i>	332
<i>The Hard Drive</i>	333
<i>Creating Files</i>	335
<i>Creating Directories</i>	335
<i>Listing Files</i>	336
<i>Handling Files</i>	339
<i>Moving</i>	340
<i>Copying</i>	342
<i>Deleting</i>	342
<b>16.4 File Content</b>	<b>343</b>
<i>Writing Content</i>	343
<i>Adding Content</i>	346
<i>Reading Content</i>	347
<b>16.5 Access to Files</b>	<b>348</b>
<b>16.6 File System in Real Life</b>	<b>350</b>
<b>Chapter 17—Geolocation API</b>	
<b>17.1 Finding Your Location</b>	<b>355</b>
<i>HTML Document</i>	355
<i>GetCurrentPosition(location)</i>	356
<i>GetCurrentPosition(location, error)</i>	357
<i>GetCurrentPosition(location, error, configuration)</i>	358
<i>WatchPosition(location, error, configuration)</i>	359
<i>Practical Uses with Google Maps</i>	360
<b>Chapter 18—History API</b>	
<b>18.1 History Interface</b>	<b>363</b>
<i>Navigating the Web</i>	363
<i>New Methods</i>	364
<i>Fake URLs</i>	364
<i>State Property</i>	366
<i>Real-Life Example</i>	368
<b>Chapter 19—Offline API</b>	
<b>19.1 Cache Manifest</b>	<b>371</b>
<i>The Manifest File</i>	371
<i>Categories</i>	372
<i>Comments</i>	373
<i>Using the Manifest File</i>	373
<b>19.2 Offline API</b>	<b>375</b>
<i>Errors</i>	375
<i>Online and Offline</i>	376
<i>Cache Process</i>	377
<i>Progress</i>	378
<i>Updating the Cache</i>	380

## **Chapter 20—Page Visibility API**

<b>20.1 The Visibility State</b>	<b>383</b>
<i>Current State</i>	383
<i>A Better Experience</i>	384
<i>Full Detector</i>	385

## **Chapter 21—Ajax Level 2**

<b>21.1 XMLHttpRequest</b>	<b>387</b>
<i>Retrieving Data</i>	388
<i>Response Properties</i>	390
<i>Events</i>	391
<i>Sending Data</i>	392
<i>Cross-Origin Requests</i>	394
<i>Uploading Files</i>	395
<i>Real-Life Application</i>	396

## **Chapter 22—Web Messaging API**

<b>22.1 Cross Document Messaging</b>	<b>401</b>
<i>Posting a Message</i>	401
<i>Communicating with an iFrame</i>	401
<i>Filters and Cross-Origin</i>	404

## **Chapter 23—WebSocket API**

<b>23.1 WebSockets</b>	<b>407</b>
<i>WebSocket Server</i>	407
<i>Installing and Running a WS Server</i>	408
<i>Constructor</i>	409
<i>Methods</i>	409
<i>Properties</i>	409
<i>Events</i>	410
<i>HTML Document</i>	410
<i>Initiating Communication</i>	411
<i>Full Application</i>	412

## **Chapter 24—WebRTC API**

<b>24.1 Here Comes the Revolution</b>	<b>415</b>
<i>The Old Paradigm</i>	415
<i>The New Paradigm</i>	416
<i>Requisites</i>	416
<i>Peer Connection</i>	417
<i>ICE Candidate</i>	417
<i>Offer and Answer</i>	418
<i>SessionDescription</i>	418
<i>Media Streams</i>	419
<i>Events</i>	419
<i>The End</i>	419
<b>24.2 Implementing WebRTC</b>	<b>420</b>
<i>Signaling Server</i>	420
<i>ICE Servers</i>	421

<i>HTML Document</i>	422
<i>Javascript Code</i>	422
<i>Real-Life Application</i>	427
<b>24.3 Data Channels</b>	<b>427</b>
<i>Creating Data Channels</i>	427
<i>Sending Data</i>	428
<b>Chapter 25—Web Audio API</b>	
<b>25.1 Audio Node Structure</b>	<b>433</b>
<i>Audio Nodes</i>	433
<i>Audio Context</i>	434
<i>Audio Sources</i>	435
<i>Connecting Nodes</i>	436
<b>25.2 Sounds for the Web</b>	<b>436</b>
<i>Two Basic Nodes</i>	437
<i>Loops and Times</i>	439
<i>Creating AudioNodes</i>	439
<i>AudioParam</i>	440
<i>GainNode</i>	441
<i>DelayNode</i>	443
<i>BiquadFilterNode</i>	444
<i>DynamicsCompressorNode</i>	445
<i>ConvolverNode</i>	446
<i>PannerNode and 3D Sound</i>	447
<i>AnalyserNode</i>	450
<b>Chapter 26—Web Workers API</b>	
<b>26.1 Doing the Hard Work</b>	<b>455</b>
<i>Creating a Worker</i>	455
<i>Sending and Receiving Messages</i>	456
<i>Detecting Errors</i>	458
<i>Terminating Workers</i>	459
<i>Synchronous APIs</i>	461
<i>Importing Scripts</i>	461
<i>Shared Worker</i>	462
<b>Conclusion</b>	
<b>Working for the World</b>	<b>467</b>
<i>The Alternatives</i>	467
<i>Modernizr</i>	468
<i>Libraries</i>	469
<i>Google Chrome Frame</i>	469
<b>Working for the Cloud</b>	<b>470</b>
<b>APIs Not included</b>	<b>471</b>
<b>What You Should Know</b>	<b>471</b>
<b>Final Words from the Author</b>	<b>472</b>