References

Dive into HTML5, Mark Pilgrim, http://diveintohtml5.org/

HTML5 & CSS3 Develop with Tomorrow's Standards Today, Hogan, Pragmatic Programmers

Various Web pages as indicated on individual slides
Video Codec

Software or hardware algorithm that compresses/decompresses video

HTML 5 Video Codec Support

<table>
<thead>
<tr>
<th>Browser</th>
<th>Ogg Theora (VP3)</th>
<th>H.264</th>
<th>VP8 (WebM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE</td>
<td>No</td>
<td>in IE 9</td>
<td>Future Google plugin</td>
</tr>
<tr>
<td>FireFox</td>
<td>Yes</td>
<td>No</td>
<td>in FireFox 4</td>
</tr>
<tr>
<td>Chrome</td>
<td>Yes</td>
<td>Yes/No</td>
<td>Yes</td>
</tr>
<tr>
<td>Safari</td>
<td>No</td>
<td>Yes</td>
<td>Future Google plugin</td>
</tr>
<tr>
<td>Opera</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Containers

Supports multiple codec/formats

QuickTime player
Ogg
HTML 5 Video & Audio support

Native Browser support for playing & controlling video & audio

No need for Flash
# What is Wrong with Flash?

What some people claim: 

<table>
<thead>
<tr>
<th>Buggy</th>
<th>Flash &amp; Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow</td>
<td>Many Flash sites use hover</td>
</tr>
<tr>
<td></td>
<td>iOS does not support flash</td>
</tr>
</tbody>
</table>
HTML5 Video Support

Playing Class Video in Safari
<head>
<meta charset="UTF-8" />
<title>Video</title>
</head>
<body>

<video id="player" controls>
</video><br/>
<button onclick="document.getElementById('player').play()">Play</button>
<button onclick="document.getElementById('player').pause()">Pause</button>
<button onclick="document.getElementById('player').volume+=0.1">Volume up</button>
<button onclick="document.getElementById('player').volume-=0.1">Volume down</button>
</body>
</html>
Advantages

Works on iOS

Can control video from Javascript

Don't need to interact with Flash Player
Disadvantages

Chrome & Firefox will not support H.264

Currently on Opera & Chrome support WebM
Workaround 1

Record video in multiple formats
Let browser select correct format

<video id="player" controls>
</video>
Workaround 2

Use flash

Adobe liked Google's decision to drop H.264 support in Chrome
# HTML5 Audio

Native support for streaming audio

<table>
<thead>
<tr>
<th>Format</th>
<th>IE 8</th>
<th>Firefox 3.5</th>
<th>Opera 10.5</th>
<th>Chrome 3.0</th>
<th>Safari 3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ogg Vorbis</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>MP3</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Wav</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table from http://www.w3schools.com/html5/html5_audio.asp
Audio Example

<article class="sample">
  <header>
    <h2>Drums</h2>
  </header>
  <audio id="drums" controls>
    <source src="sounds/ogg/drums.ogg" type="audio/ogg">
    <source src="sounds/mp3/drums.mp3" type="audio/mpeg">
    <a href="sounds/mp3/drums.mp3">Download drums.mp3</a>
  </audio>
</article>
Audio Example - Streeme

http://code.google.com/p/streeme/

Streams your music from your computer

Client - any browser that supports HTML5 audio
Canvas
Canvas

Native 2D graphic in browser

Supported in
IE 7.0+ (needs plugin)
FireFox 3.0+
Safari 3.0+
Chrome 3.0+
Opera 10.0+
iPhone 1.0+
Android 1.0+

source http://diveintohtml5.org/canvas.html#divingin
Examples

http://www.devlounge.net/code/10-awesome-html5-canvas-examples
Canvas

<!DOCTYPE html> <html lang="en">
<head>
    <meta charset="utf-8" />
    <script type="text/javascript">
        function drawExample() {
            var canvas = document.getElementById('draw');
            if (!canvas.getContext){ return false; }
            var context = canvas.getContext('2d');
            context.fillStyle = "rgb(200,0,0)";
            context.fillRect (10, 10, 100, 100);
        }
    </script>
</head>
<body onload="drawExample()">
    <canvas id="draw" width="150" height="150" style="border:1px dotted">
        Fallback content here
    </canvas>
</body>
</html>
function drawExample() {
    var canvas = document.getElementById('draw');
    if (!canvas.getContext){
        alert("No canvas");
        return false;
    }
    var context = canvas.getContext('2d');
    context.fillStyle = "rgb(200,0,0)";
    context.fillRect (10, 10, 100, 100);
    context.lineWidth = 2;
    context.beginPath();
    context.moveTo(10, 110);
    context.lineTo(60,160);
    context.lineTo(110, 110 );
    context.stroke();
    context.closePath();
}
</script>
Canvas method

Low level drawing methods

Good tutorial

http://diveintohtml5.org/canvas.html#divingin

List of all Canvas methods

RGraph
JavaScript Library for graphs using canvas

http://www.rgraph.net/

Provide data for graph

Configure graph settings
window.onload = function () {
    var data = [10,4,17,50,25,19,20,25,30,29,30,29];

    var line = new RGraph.Line("chart", data);
    line.Set('chart.background.barcolor1', 'rgba(255,255,255,1)');
    line.Set('chart.background.barcolor2', 'rgba(255,255,255,1)');
    line.Set('chart.background.grid.color', 'rgba(238,238,238,1)');
    line.Set('chart.colors', ['rgba(255,0,0,1)']);
    line.Set('chart.linewidth', 2);
    line.Set('chart.filled', true);
    line.Set('chart.hmargin', 5);
    line.Set('chart.gutter', 40);
    line.Set('chart.zoom.mode', 'thumbnail');
    line.Draw();
}

Example from RGraphs examples in RGraph download
Other Tools

Processing.js
http://processingjs.org/

JavaScript implementation of Processing
Language for creating images, animations, and interactions

MooTools Canvas Library
http://forvar.de/js/mcl/

Supports
  Layers
  Threads
  Items
  Animations
WebSockets
The Problem

How can browser get data from server without reloading a page
AJAX - Asynchronous JavaScript and XML

1998 - Microsoft implements xmlhttp
   Makes independent request to server
   Has nothing to do with XML

2002 - Mozilla implements XMLHttpRequest

2005 - Google maps uses xmlhttp
Sample xmlhttp JavaScript Code

```javascript
xmlhttp.onreadystatechange=function()
{
    if (xmlhttp.readyState==4 && xmlhttp.status==200)
    {
        document.getElementById("myDiv").innerHTML=xmlhttp.responseText;
    }
}

xmlhttp.open("GET","ajax_info.txt",true);
xmlhttp.send();
```
Ajax Issue

Server can not send data to client

Client has to request data

How to build a chat client as web page

When you send message can send it to server via xmlhttp

How does server send message to other person?
Polling

Client can continually ask server if it has data

Contributes resources on client and server side
Comet

Allows server to push data to client

Uses 2 connections and hidden iframe

Send data to server via normal xmlhttp

Another xmlhttp request to server for push

  Connection kept open until server has data

  Server sends data

  Connection stays open

  In some situations client may have to reopen connection
CometD

http://cometd.org/

Commonly used library for comet

Javascript, java, perl, python
Comet Issues

Resource consumption
   2 connections
   HTTP 1.1 allows only 2 connection to a server

Protocol not standard

Complications due to browser differences

Problems in keeping HTTP request open
Websockets

Simple bidirectional connect between client & server
Uses one network connection

Client Side Interface

Constructor

new WebSocket("ws:host address")

Methods

void send(in DOMString data);
void close();

Events

onopen
onmessage
onerror
onclose
Basic Operation

```javascript
var socket;
var host = "ws://localhost/some/server";

var socket = new WebSocket(host);

socket.onmessage = function(message){
    alert(message);
}

socket.send("Hello server");
```

You need a server that implements the WebSocket protocol
Support & Problems

Limited browser support

Google found security hole
    Same issue affects Flash & Java

Supporting Browsers
    Chrome 4
    Safari 4
    iOS 4.2

Browser turned off Websockets
    Firefox 4
    Opera 11
Socket.IO

JavaScript library that supports
  WebSocket
  Adobe Flash Socket
  AJAX long polling (Comet)
  AJAX multipart streaming
  Forever Iframe
  JSNONP Polling

One interface
Library selects actual protocol
WebSockets