Units of Measure

CSS3

Pixels on a Screen

When we set the size of something in CSS, the default and base measure of everything is the pixel.

Traditionally a pixel is equivalent to one “dot” on the screen, usually composed of different intensities of red, green, and blue. In combination, enough coloured dots produce what you see on-screen when using most any digital device.

A computer monitor, for example, that boasts a display resolution of 1920 pixels wide and 1080 pixels high features a total of 2,073,600 pixels. A phone screen may feature the same resolution (pixel width, height, and total) as that computer monitor, which is great for a clear picture even up close!

This does, however, pose a question and potential problem: 16 pixel tall text on the computer screen might be legible, but can that same text be legible on wildly different display of the same (or different) resolution—like the phone?

Pixel Density

When it comes to CSS pixels as a measurement the browser must be very conscious of a screen's pixel density.

They use a ratio to decide how many on-screen pixels should represent the "px" CSS values.

Generally, this ratio is described as 96 pixels per screen inch. Should there be greater or fewer actual pixels per inch in the actual display, the browser will adjust accordingly to emulate that sizing.

This is done to ensure consistency and legibility regardless of screen, otherwise as developers we would have to write all sorts of code to determine the pixel density of the current display and attempt to calculate this on our own using JavaScript or some other convoluted method.

This saves us a lot of headache and equals out much of the playing field as it pertains to use of the pixel unit across the web.

Absolute Length Units

Unless you're dealing with print, non-digital based measurements are seen as bad practice on the web. Please keep that in mind as you take a look at this table of absolute length units available in CSS:

Unit	Name	Equivalent to
`cm`	Centimeters	1cm = 96px/2.54
`mm`	Millimeters	1mm = 1/10th of 1cm
`Q`	Quarter-millimeters	1Q = 1/40th of 1cm
`in`	Inches	1in = 2.54cm = 96px
`pc`	Picas	1pc = 1/6th of 1in
`pt`	Points	1pt = 1/72th of 1in
`px`	Pixels	1px = 1/96th of 1in

Table courtesy of: https://developer.mozilla.org/en-US/docs/Learn/CSS/Building_blocks/Values_and_units#lengths

Relative Length Units

When developing stylesheets on the web, most commonly you deal with the aforementioned pixel unit as well as an array of the available relative length units.

Familiarize yourself with the available options, with special attention to the widely used em and rem units:

- em
  Based on the size or font-size of the parent element.
- rem
  Based on the font-size assigned to the HTML element on the page.

What does em mean? “rem” stands for “relative em.”

Unit	Relative to
`em`	Font size of the parent, in the case of typographical properties like `font-size`, and font size of the element itself, in the case of other properties like `width`.
`ex`	x-height of the element's font.
`ch`	The advance measure (width) of the glyph "0" of the element's font.
`rem`	Font size of the root element.
`lh`	Line height of the element.
`vw`	1% of the viewport's width.
`vh`	1% of the viewport's height.
`vmin`	1% of the viewport's smaller dimension.
`vmax`	1% of the viewport's larger dimension.

Table courtesy of: https://developer.mozilla.org/en-US/docs/Learn/CSS/Building_blocks/Values_and_units#Relative_length_units

Percentages

Percentages are always relative to something—usually a parent element.

When assigning a font-size percentage, it will be a percent size based on the parent element's font-size.

When assigning a percentage width value, it will be a width based on the width of the parent element.

You can learn more about percentages here.

Recommended Reading

Continue exploring units of measure and how values in CSS work:

- Meyer, E. A; Weyl, E. (October 2017). CSS: The Definitive Guide, 4th Edition. O'Reilly Media, Inc.
  - Chapter 4. Values and Units
    - Numbers and Percentages
    - Distances
    - Calculation Values
    - Attribute Values