



The Design Couch Sessions

#01 : Color

Version 2 - July 2019

Originally compiled for the Edenspiekermann Singapore team



Today's program

Color types

Color spaces

Color conversion

Color management

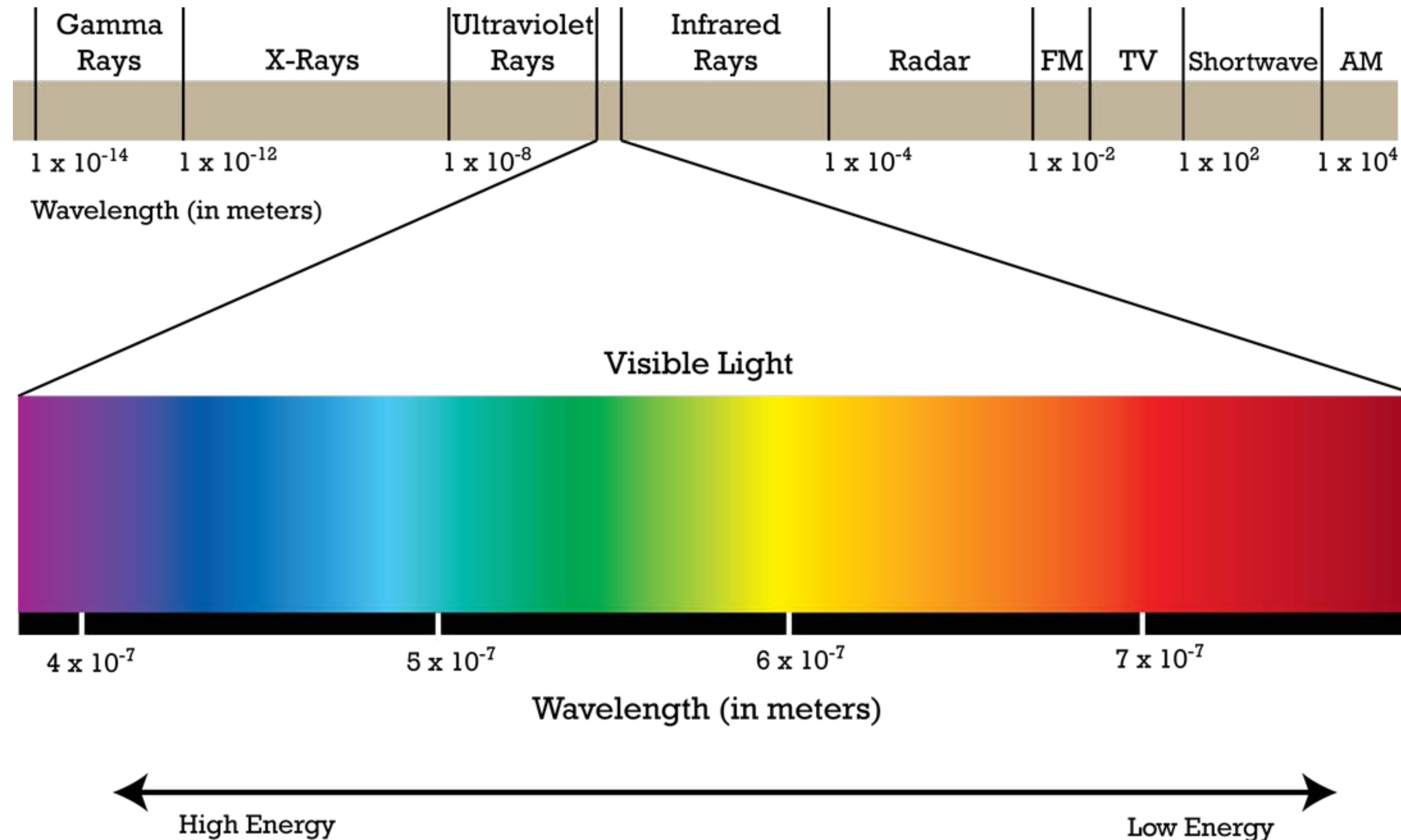
Color impaired

Color inspiration

DESIGN COUCH SESSIONS #01 : COLOR

**RGB, CMYK, Hex, HSB/HSV,
LAB**

Light are waves (and particles, but that's a different story altogether)

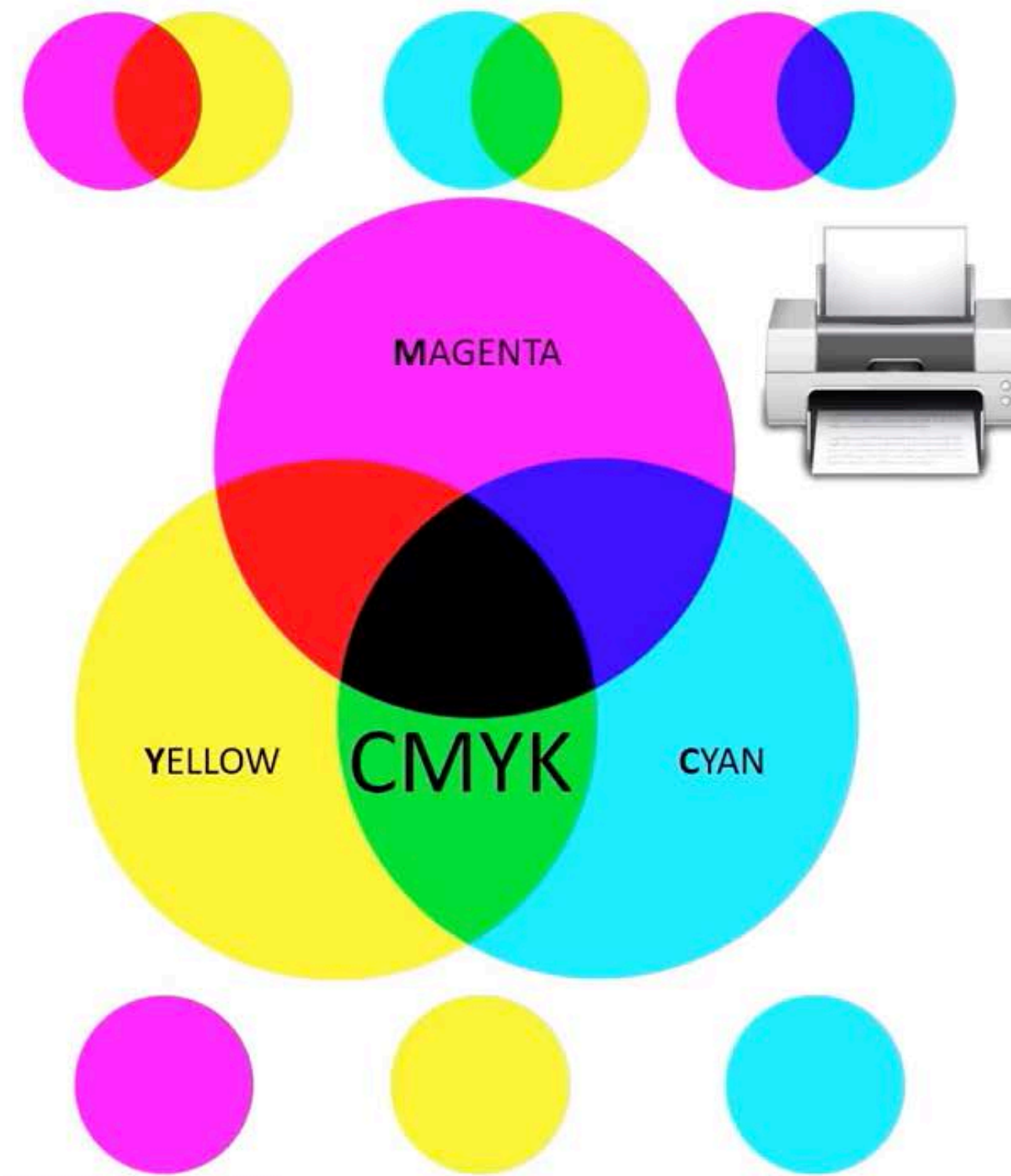


RGB vs CMYK

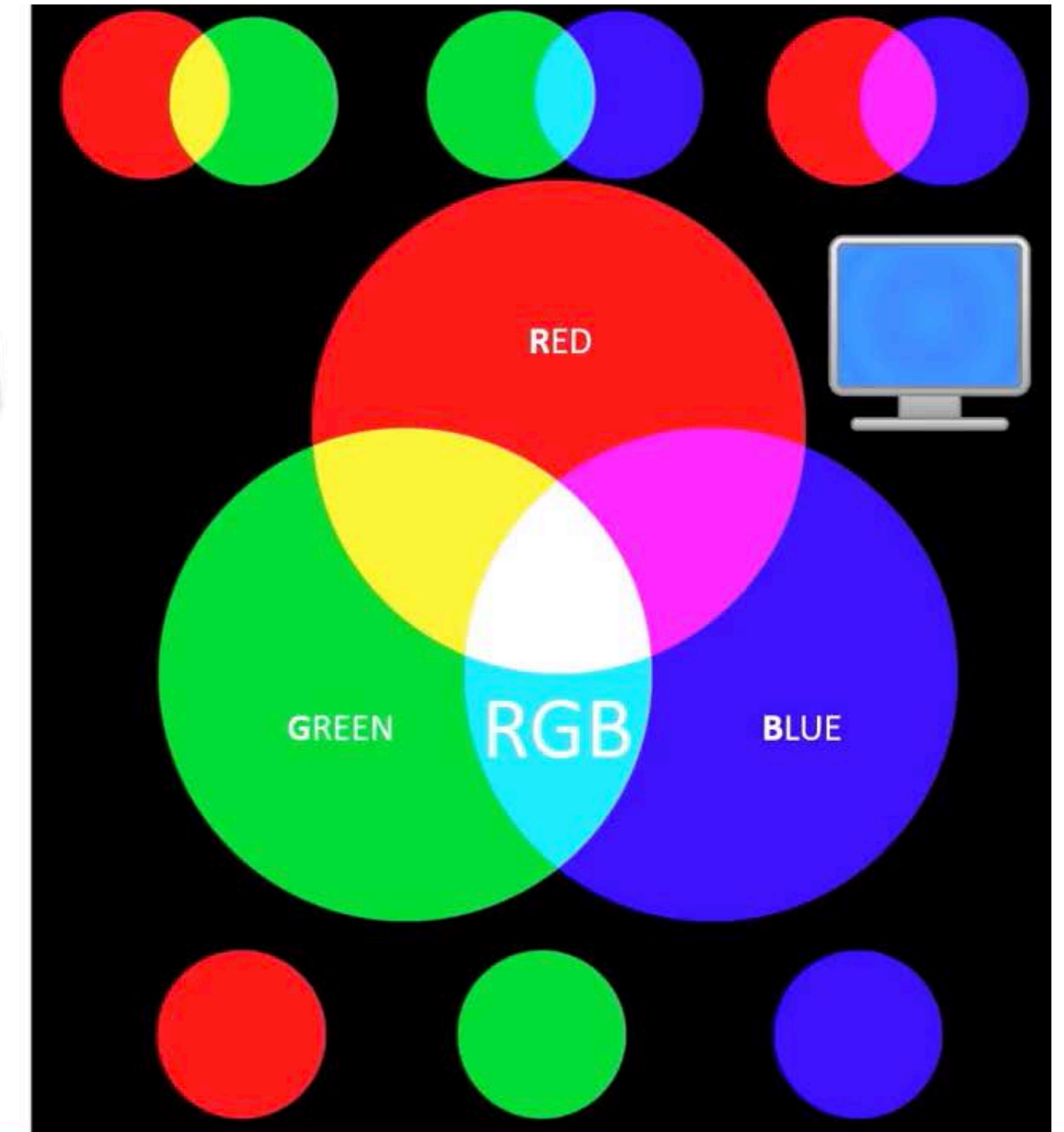
Computer screens emit light, ink on paper absorbs light. All colors together result in white on screens, and black in print.

Cyan Magenta and Yellow are the primaries in printing on paper or other substrates: the **subtractive** color model.

Red Green and Blue are the primaries in mixing light: the **additive** color model.

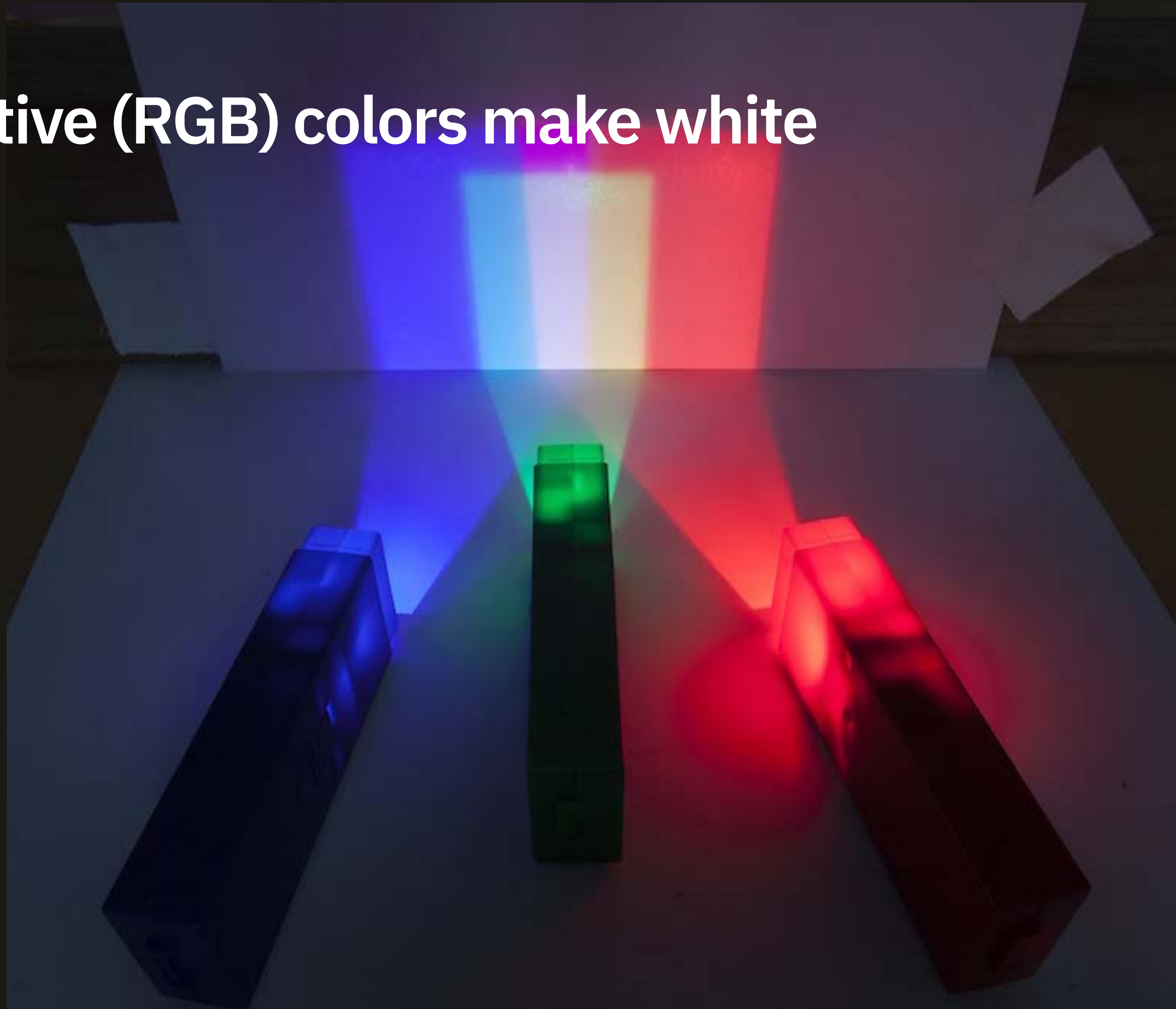


Subtractive



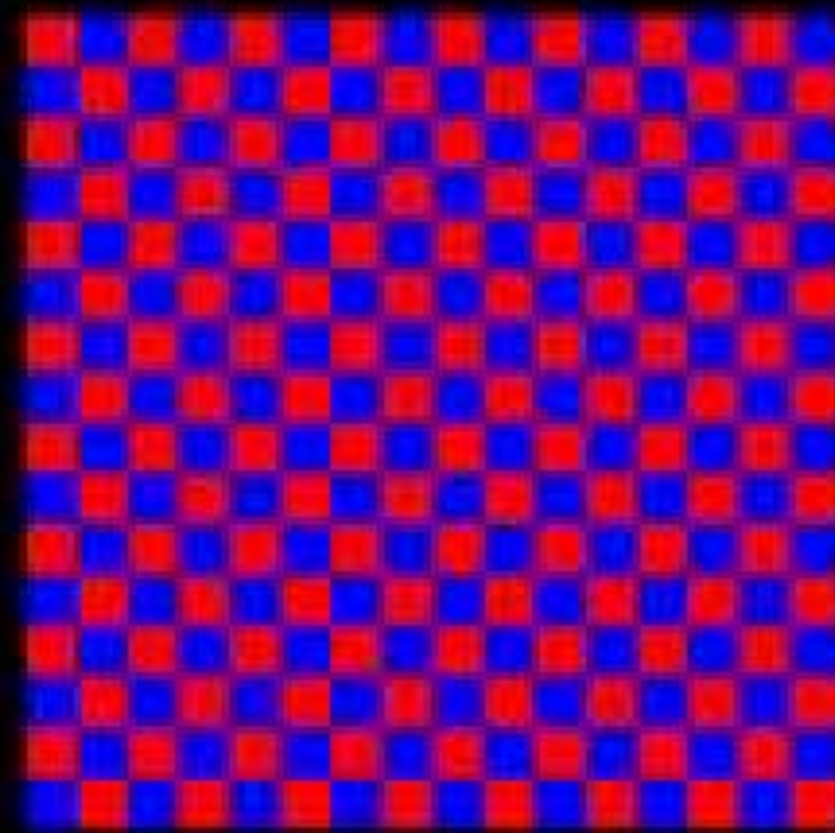
Additive

How additive (RGB) colors make white

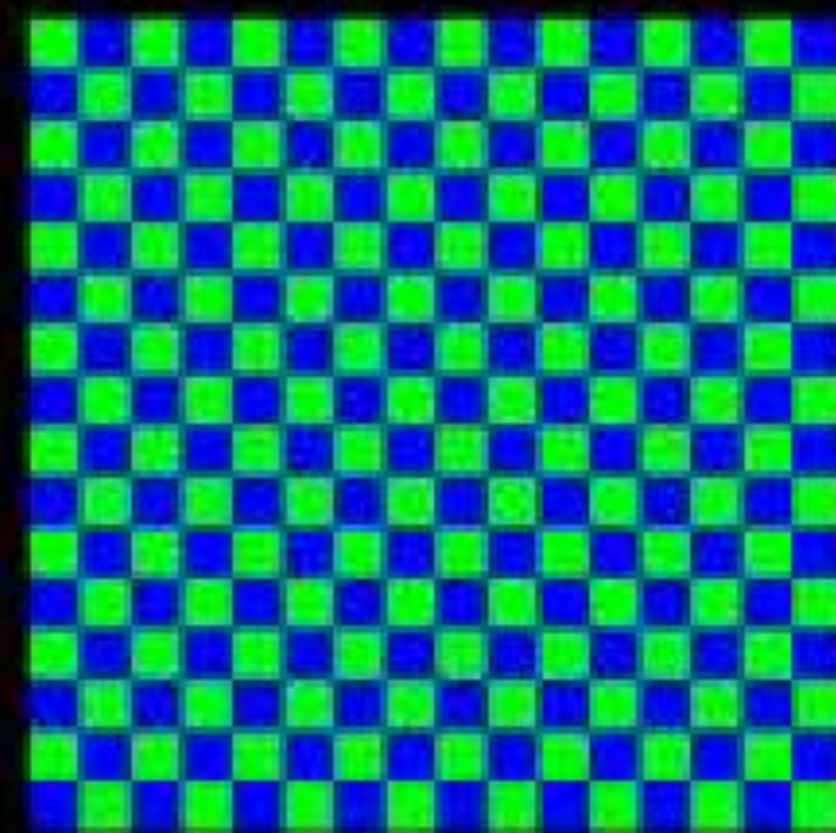


Mixing them up

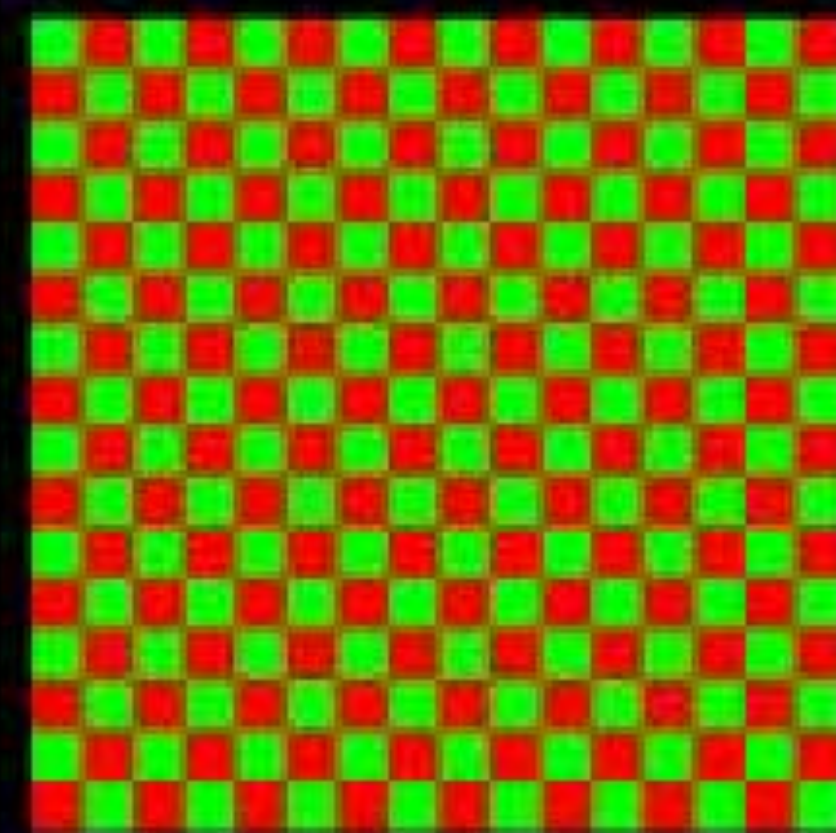
Red & Blue



Blue & Green



Green & Red



Mixing them up



Mixing them up

Magenta



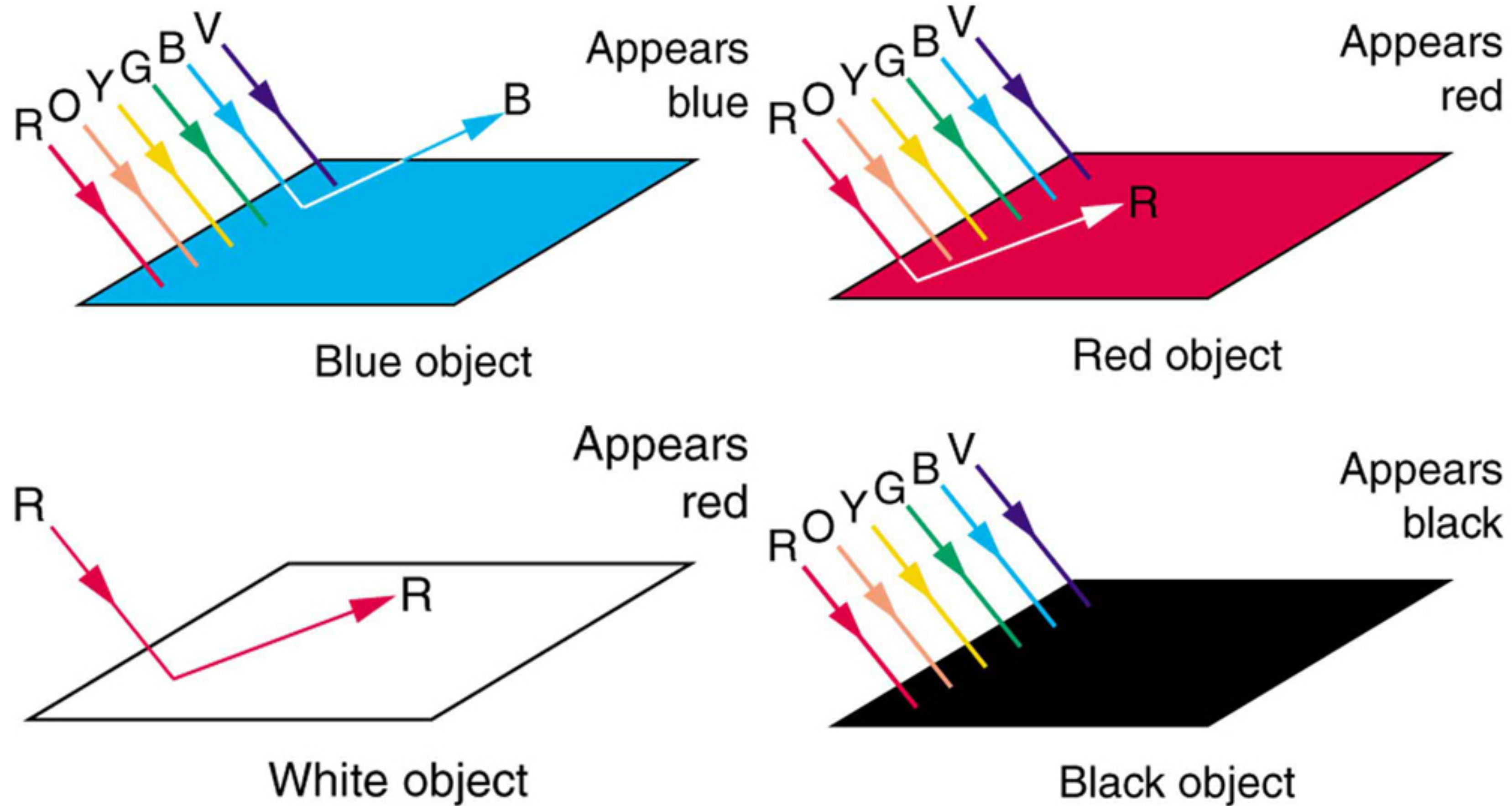
Cyan



Yellow

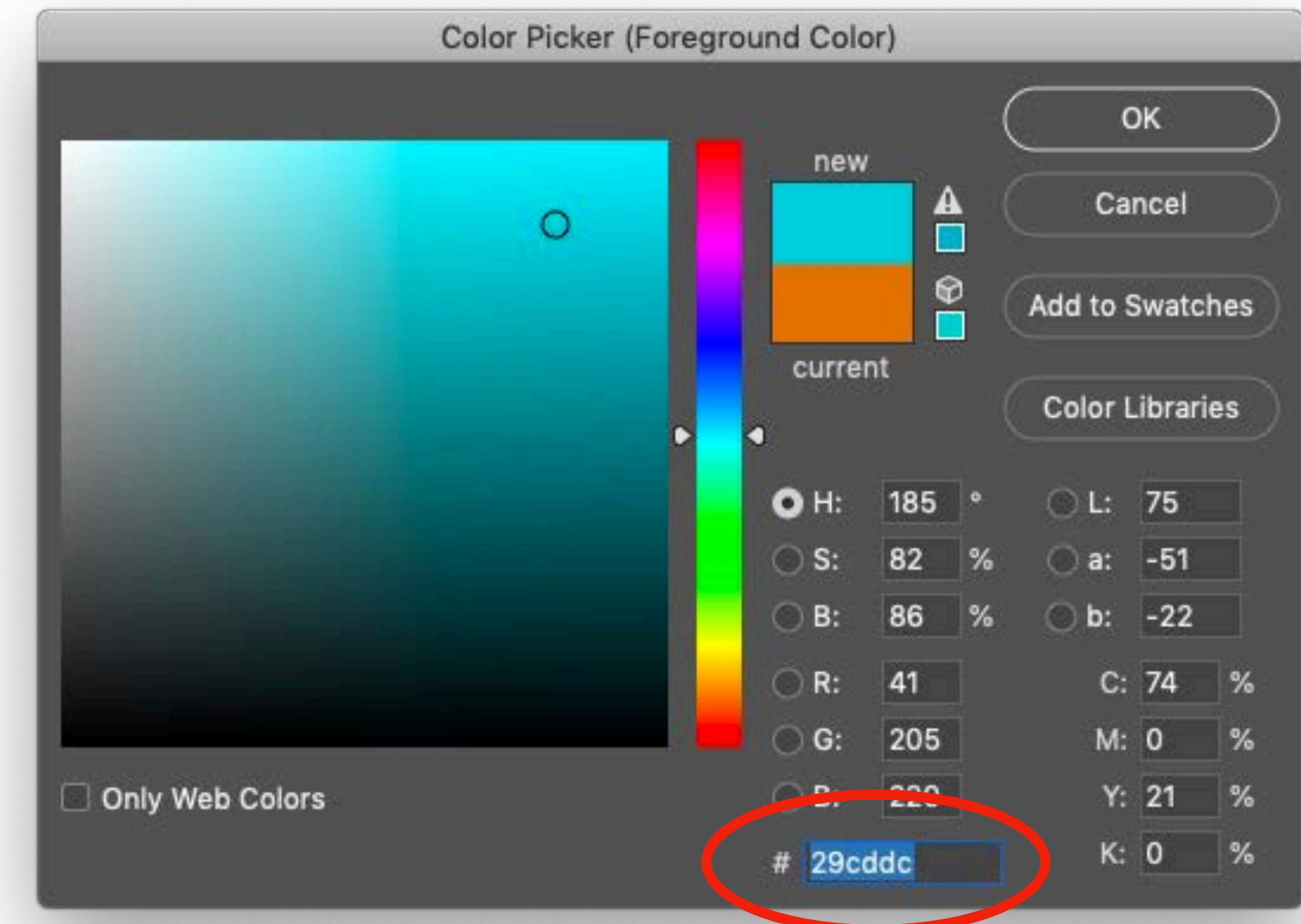


How subtractive (CMY) colors make black



Hex (or hexadecimal) colors

- $R = 0-255, G = 0-255, B = 0-255$
- $256 \times 256 \times 256 = 16.78$ million colours (= 8 bits)
- R, G and B each in 2 digits can describe all required 16.8 million colours
- 0 to 9 + A to F = 16 steps for each of the 6 digits
- #000000 = black, #FFFFFF = white



HSB/HSV colors

Hue : the color type (such as red, blue, or yellow).

→ Ranges from 0 to 360° in most applications. Each value corresponds to one color: 0 is red, 45 is a shade of orange and 55 is a shade of yellow.

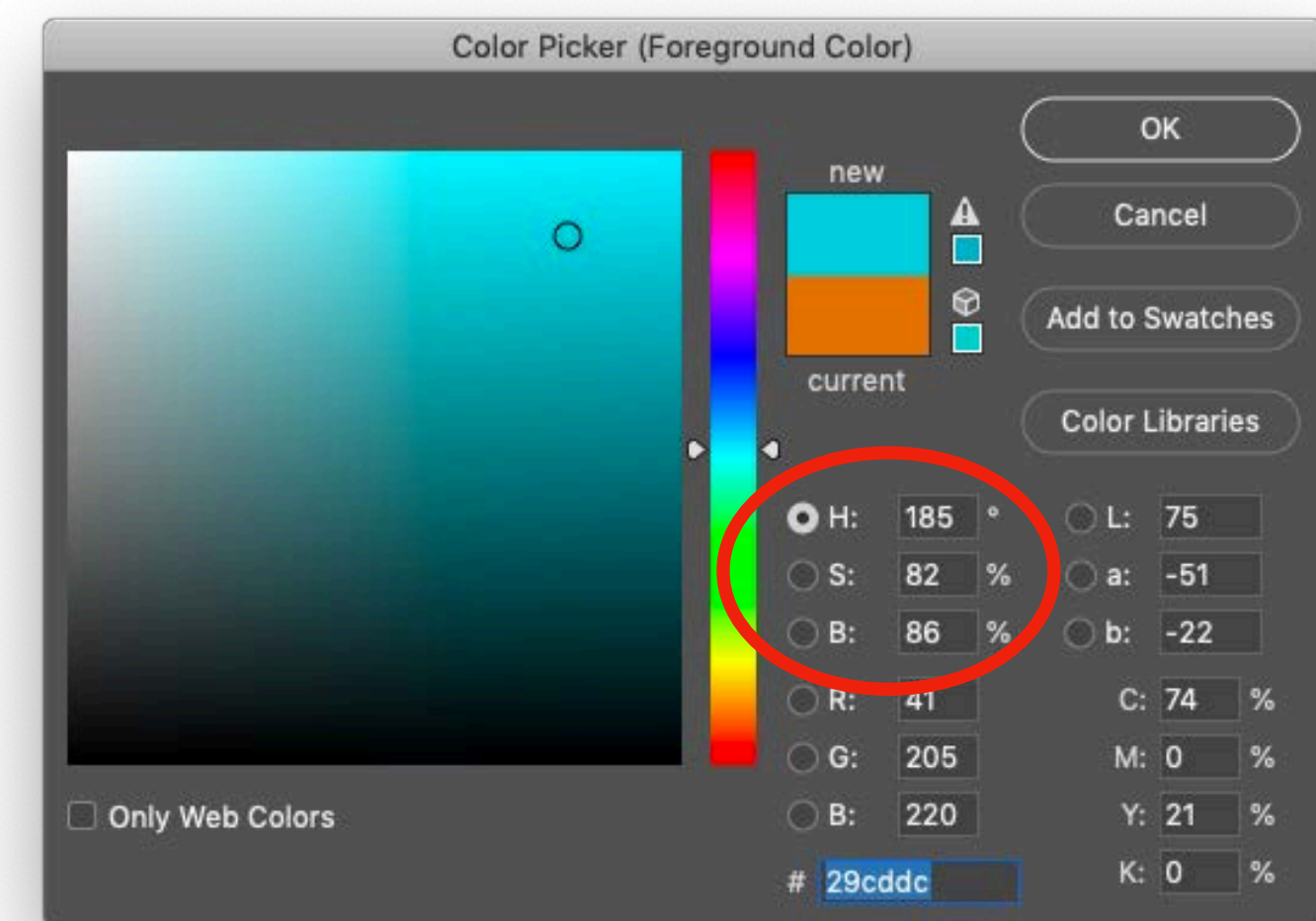
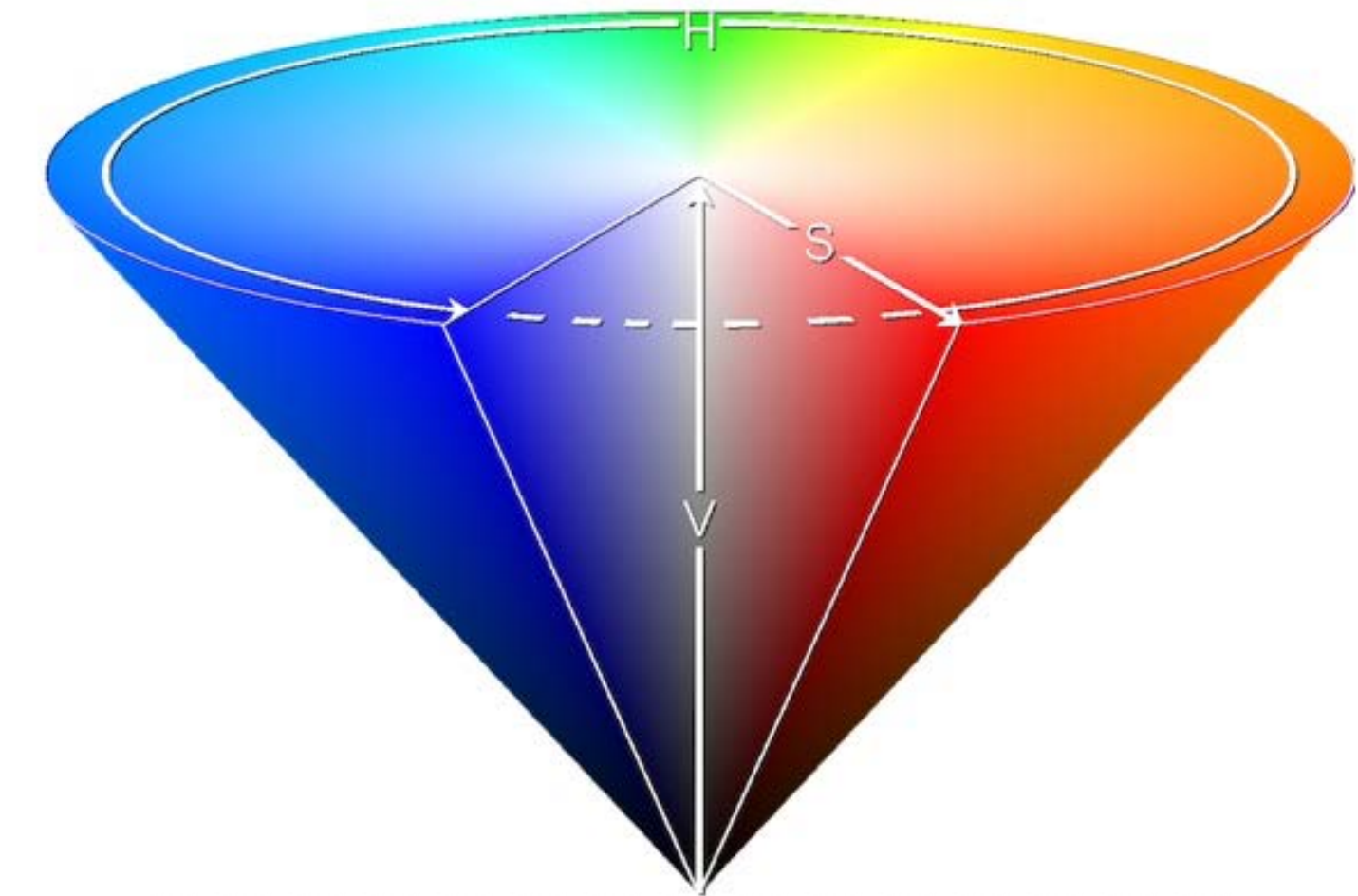
Saturation : the intensity of the color.

→ Ranges from 0 to 100%. 0 means no color, that is a shade of grey between black and white; 100 means intense color.

→ Also sometimes called the ‘purity’ by analogy to the colorimetric quantities excitation purity.

Brightness (or Value) : the brightness of the color.

→ Ranges from 0 to 100%. 0 is always black. Depending on the saturation, 100 may be white or a more or less saturated color.



Lab colors

The CIELAB (or Lab) color space is typically used when graphics for print have to be converted from RGB to CMYK, as the CIELAB gamut includes both the gamuts of the RGB and CMYK color models.

L : the lightness of the color

→ Ranges from 0 to 100: 0 is darkest, 100 is lightest in the color range

a : colors between green and red

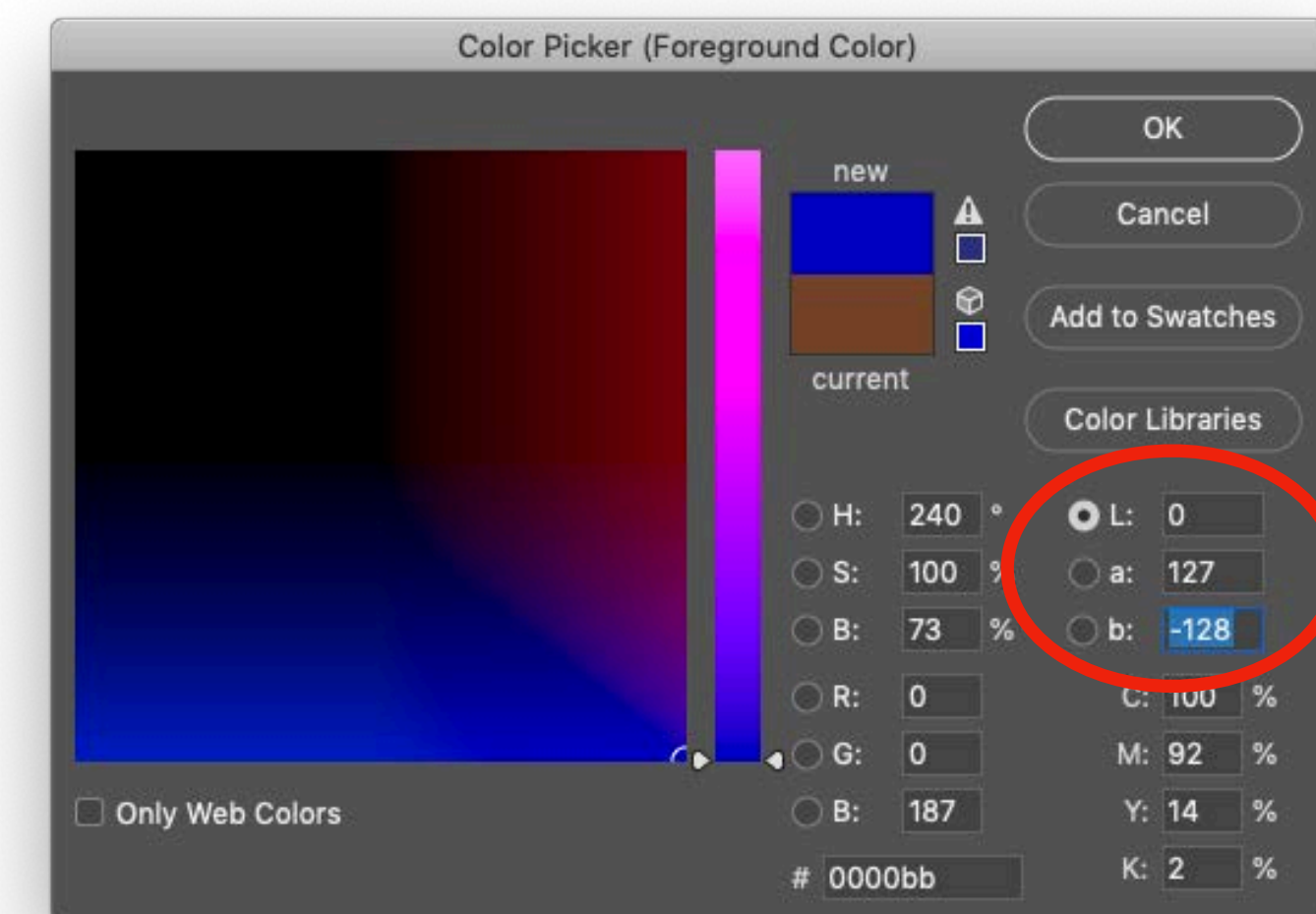
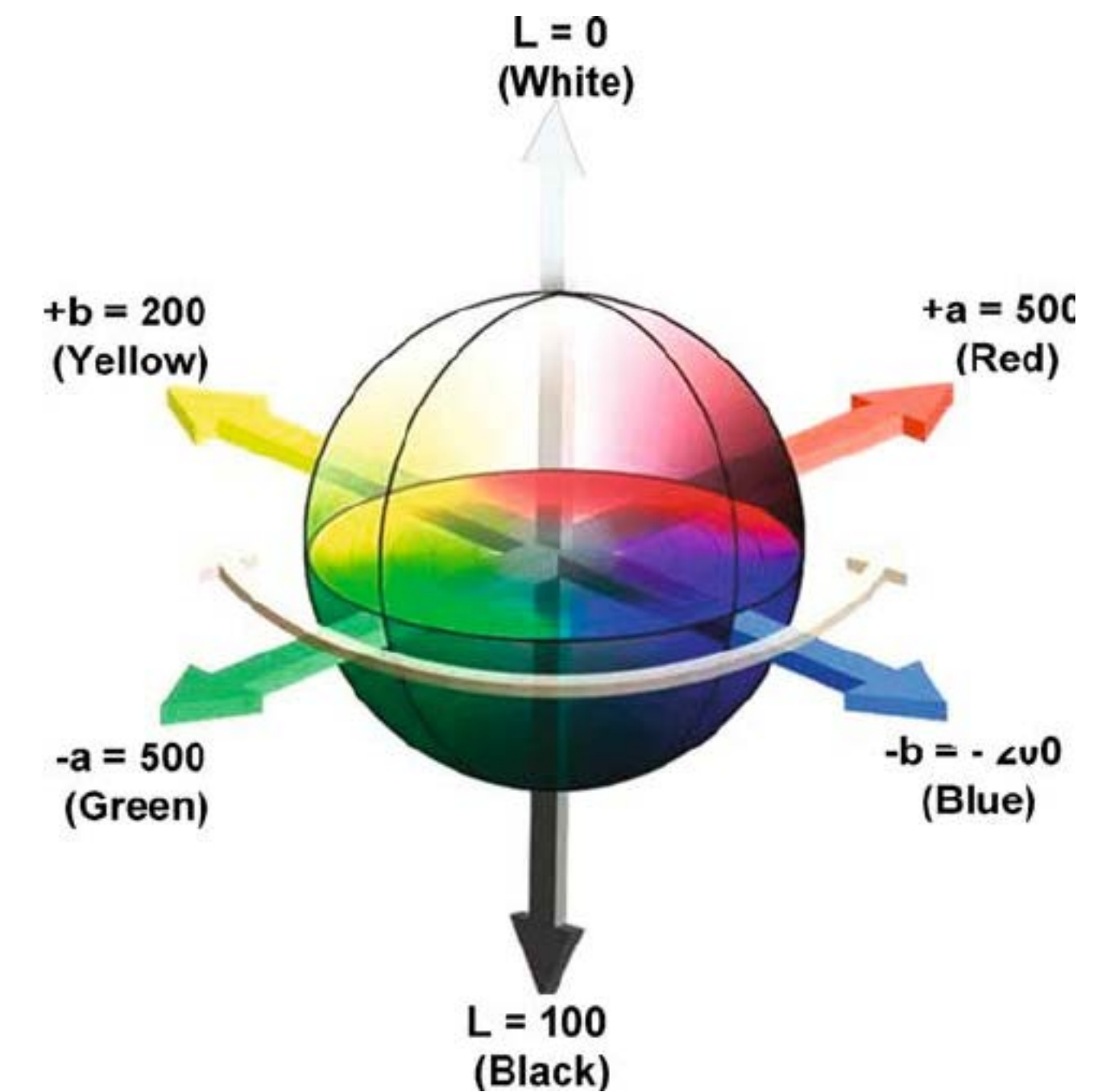
→ Ranges from -128 to +127 (in Photoshop)

→ 0 is neutral grey

b : colors between blue and yellow

→ Ranges from -128 to +127 (in Photoshop)

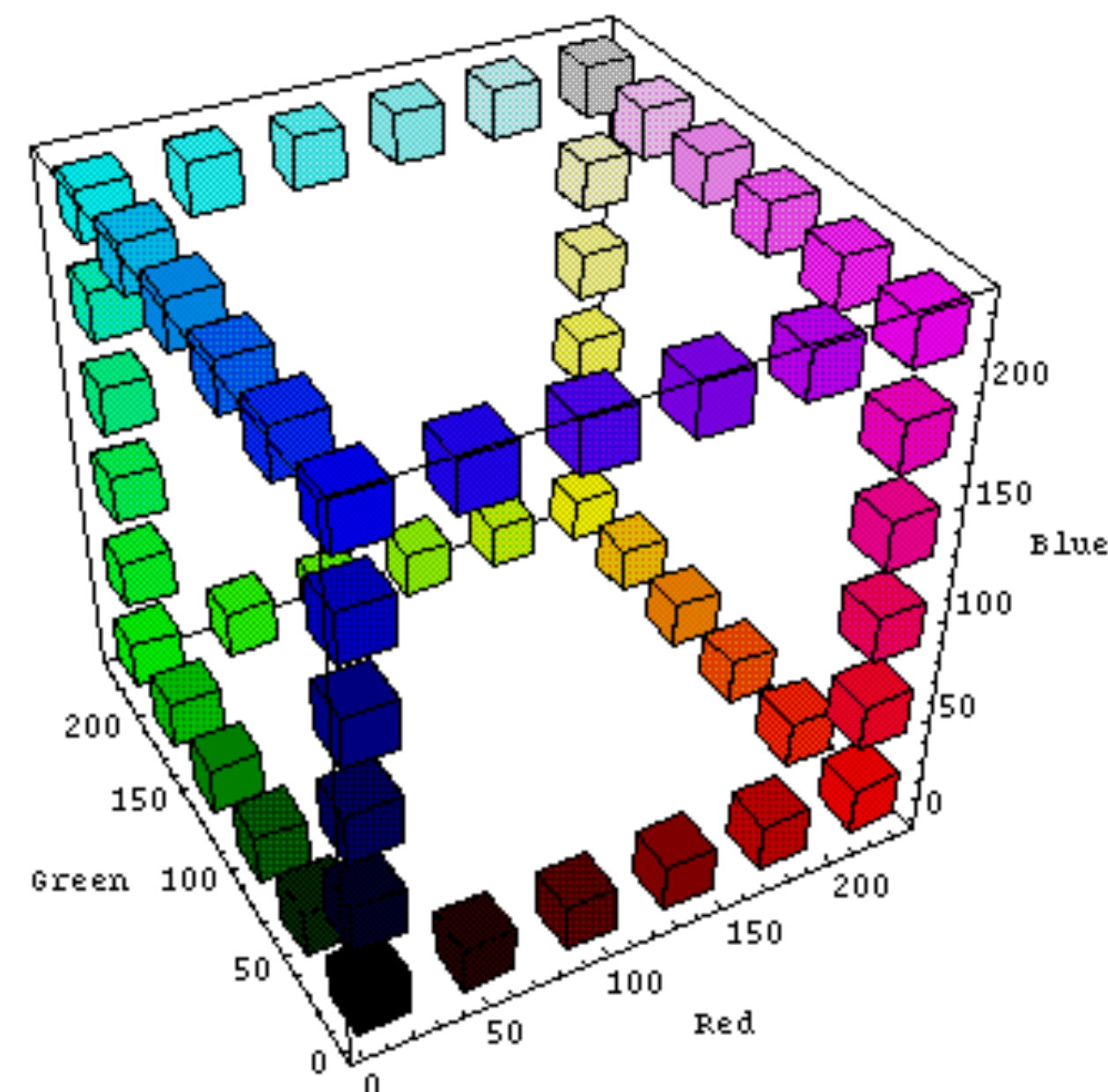
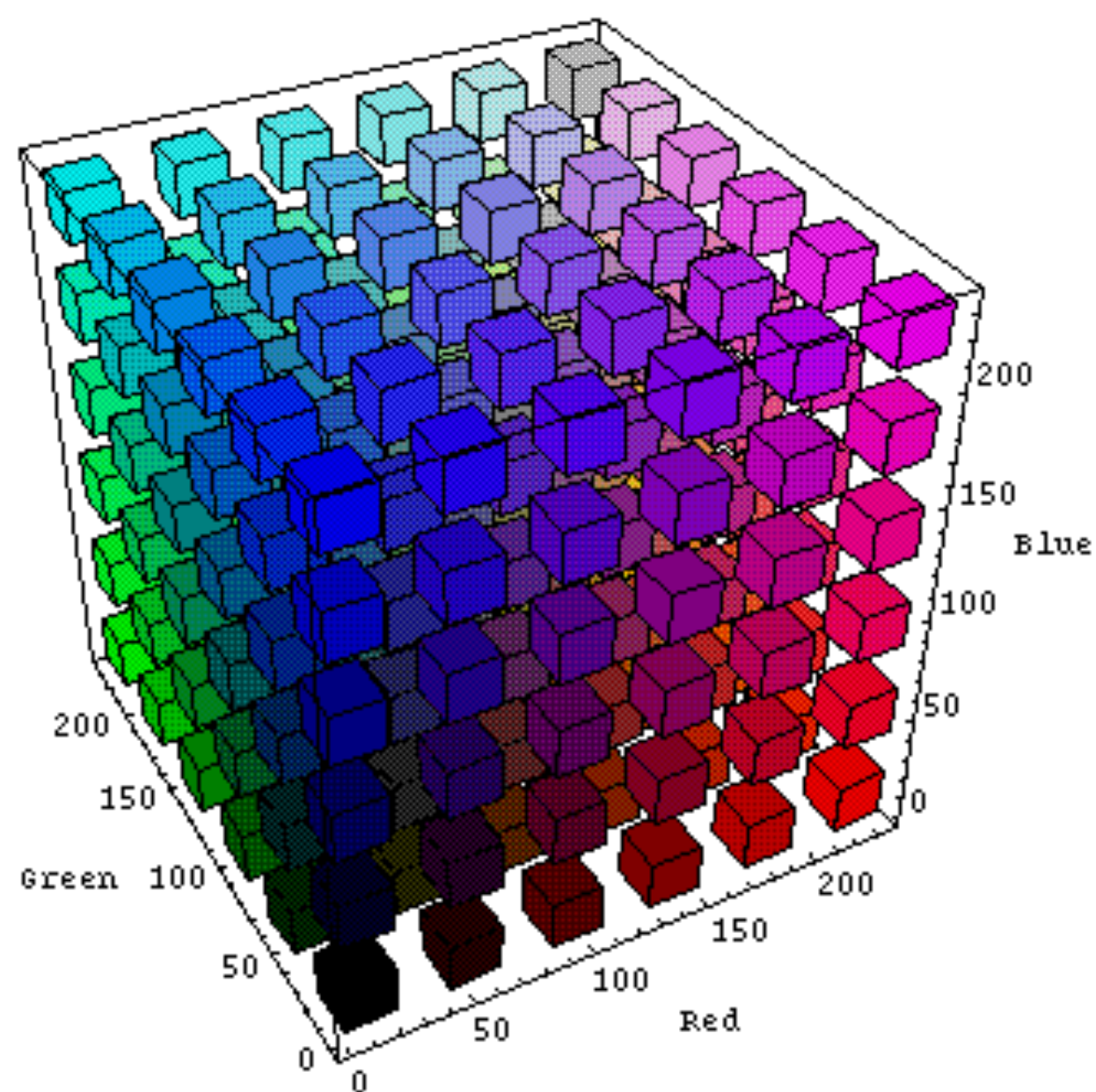
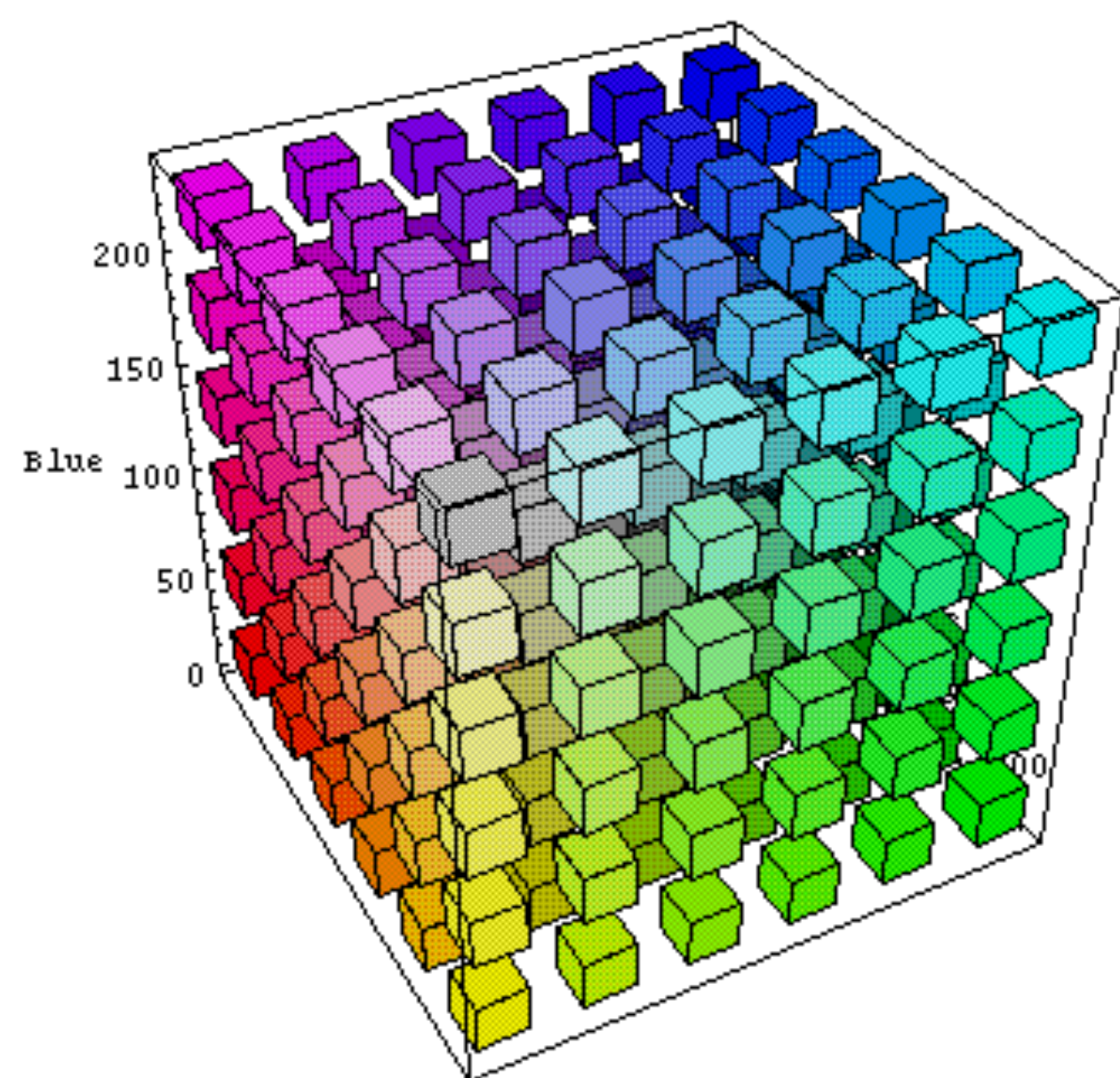
→ 0 is neutral grey.



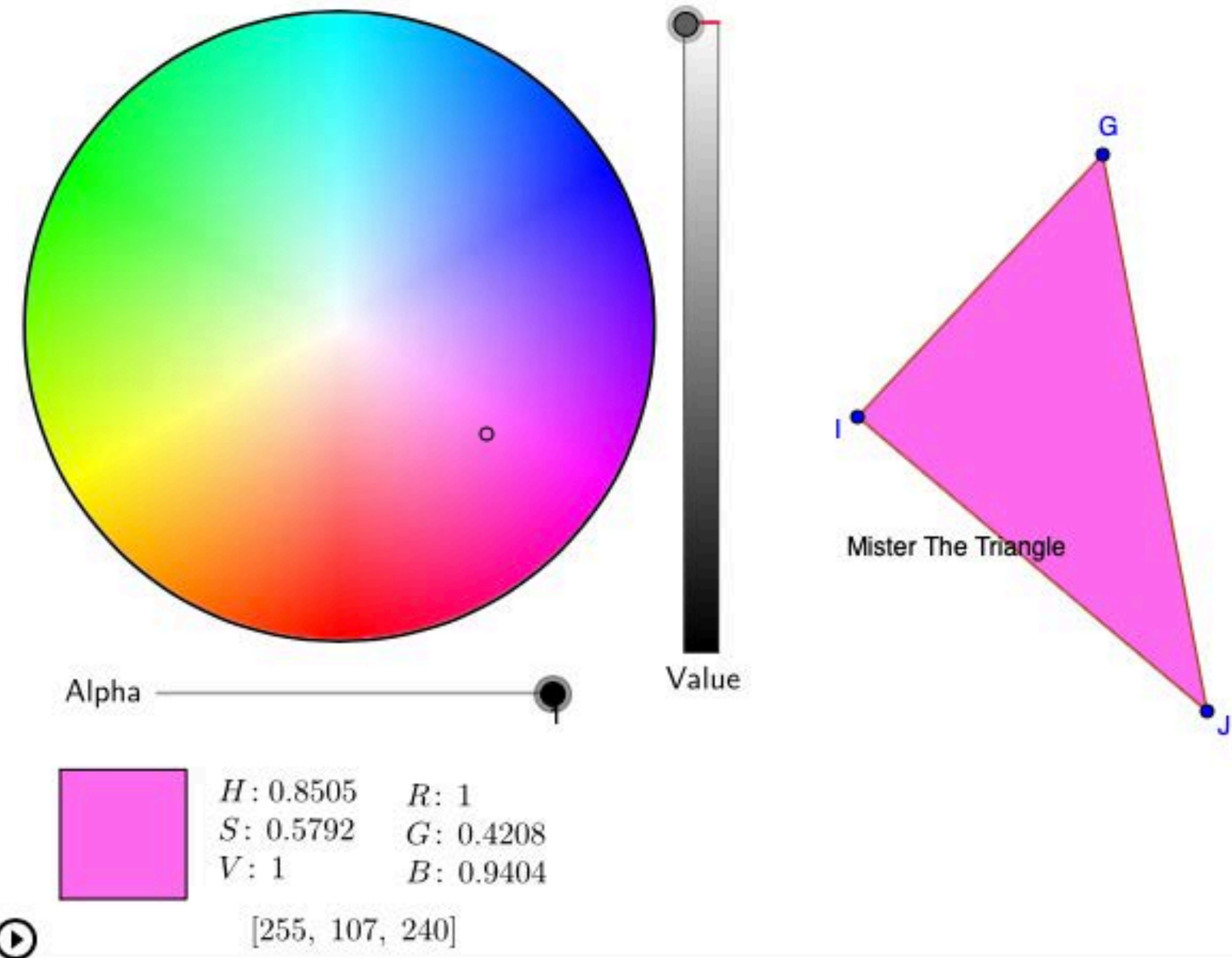
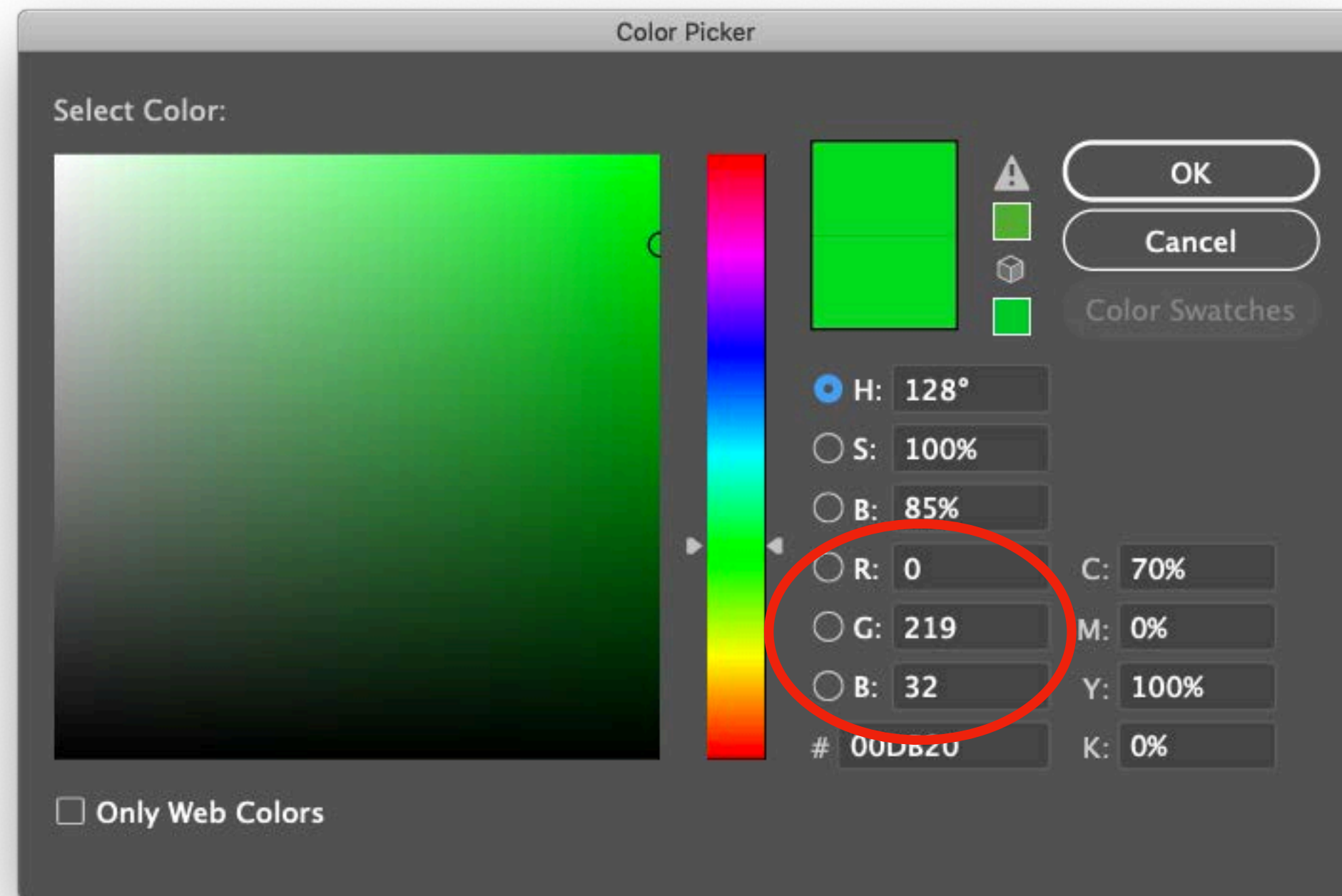
DESIGN COUCH SESSIONS #01 : COLOR

Color spaces

RGB

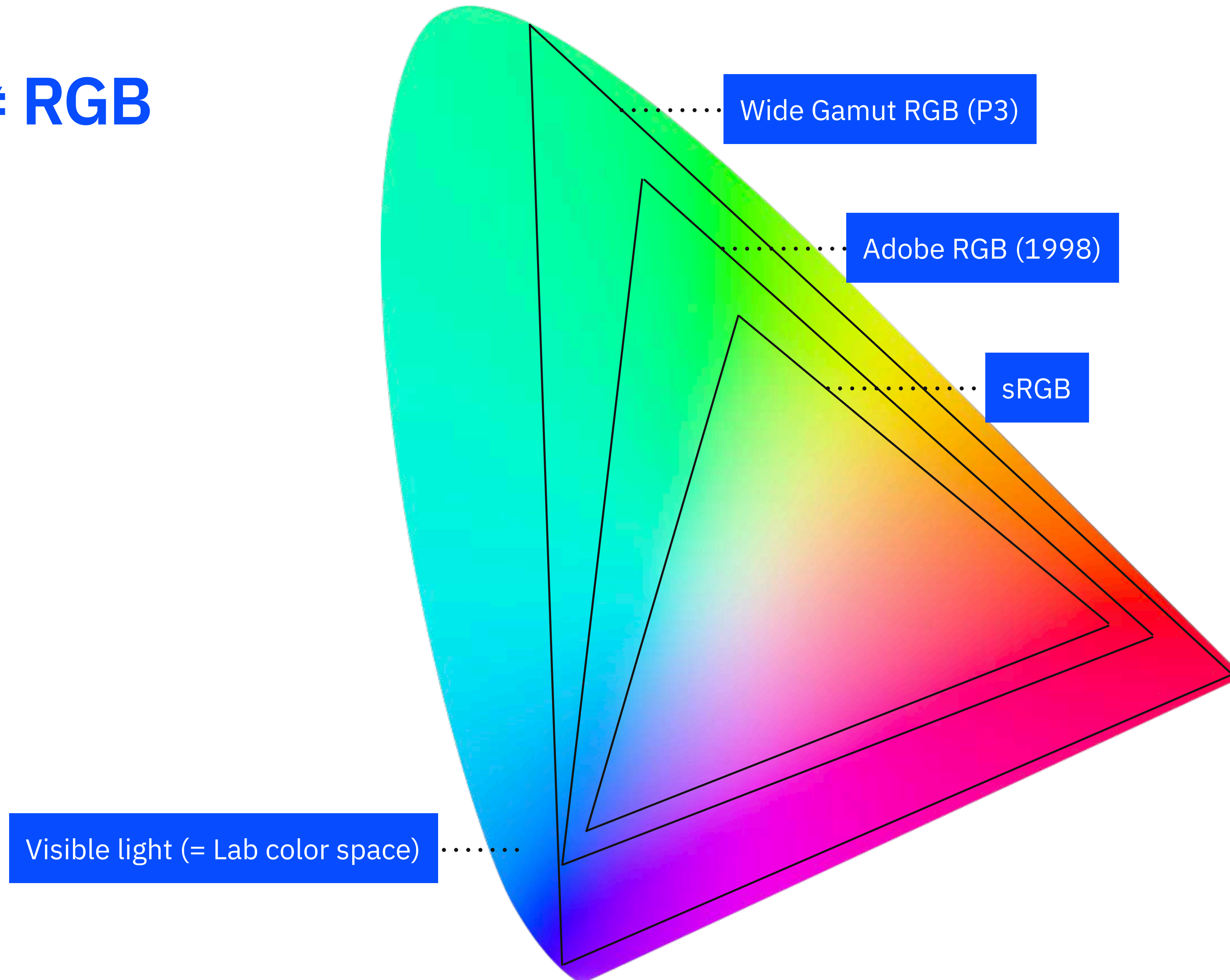


RGB



<https://help.geogebra.org/topic/colorpicker>

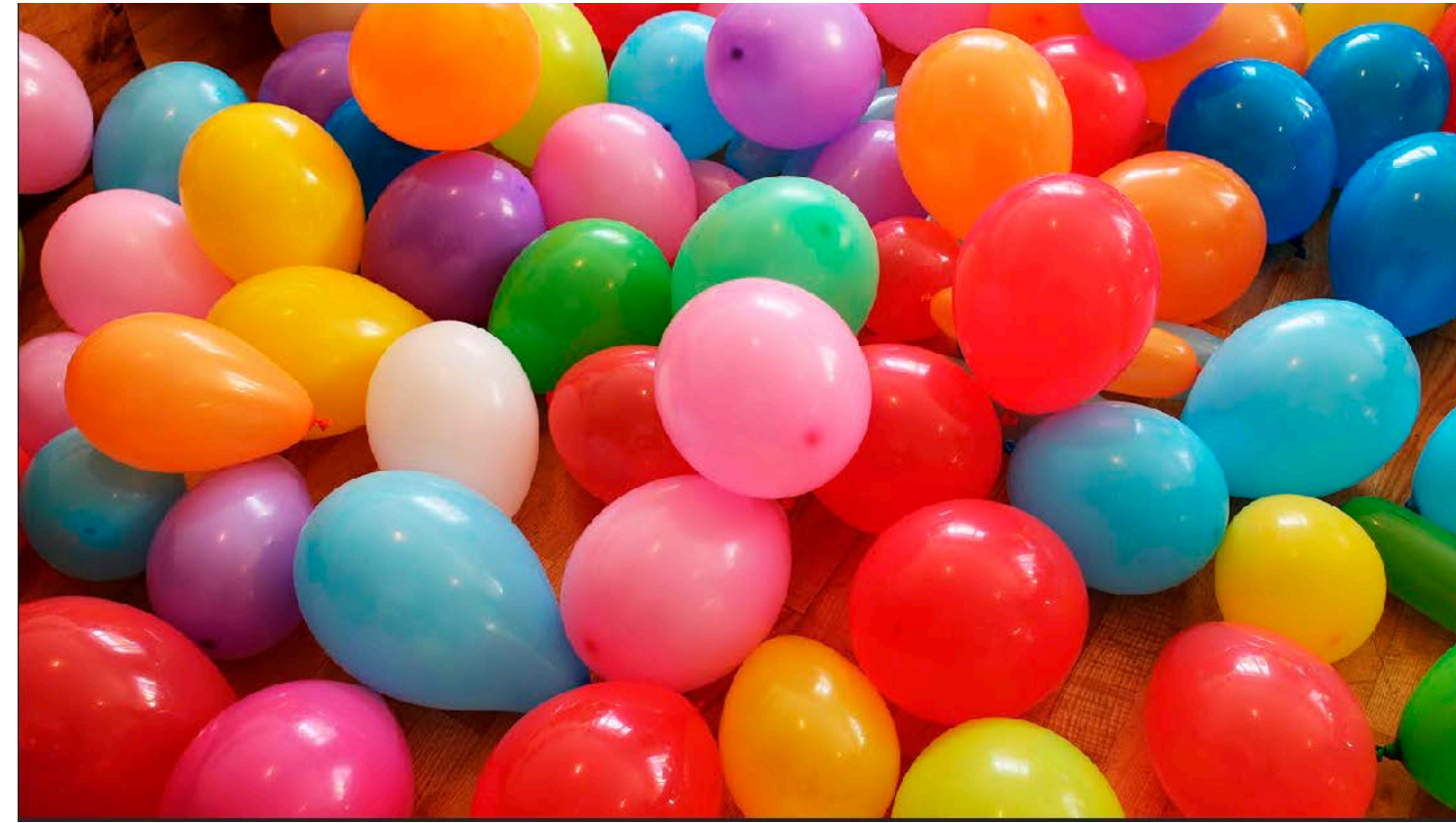
RGB ≠ RGB



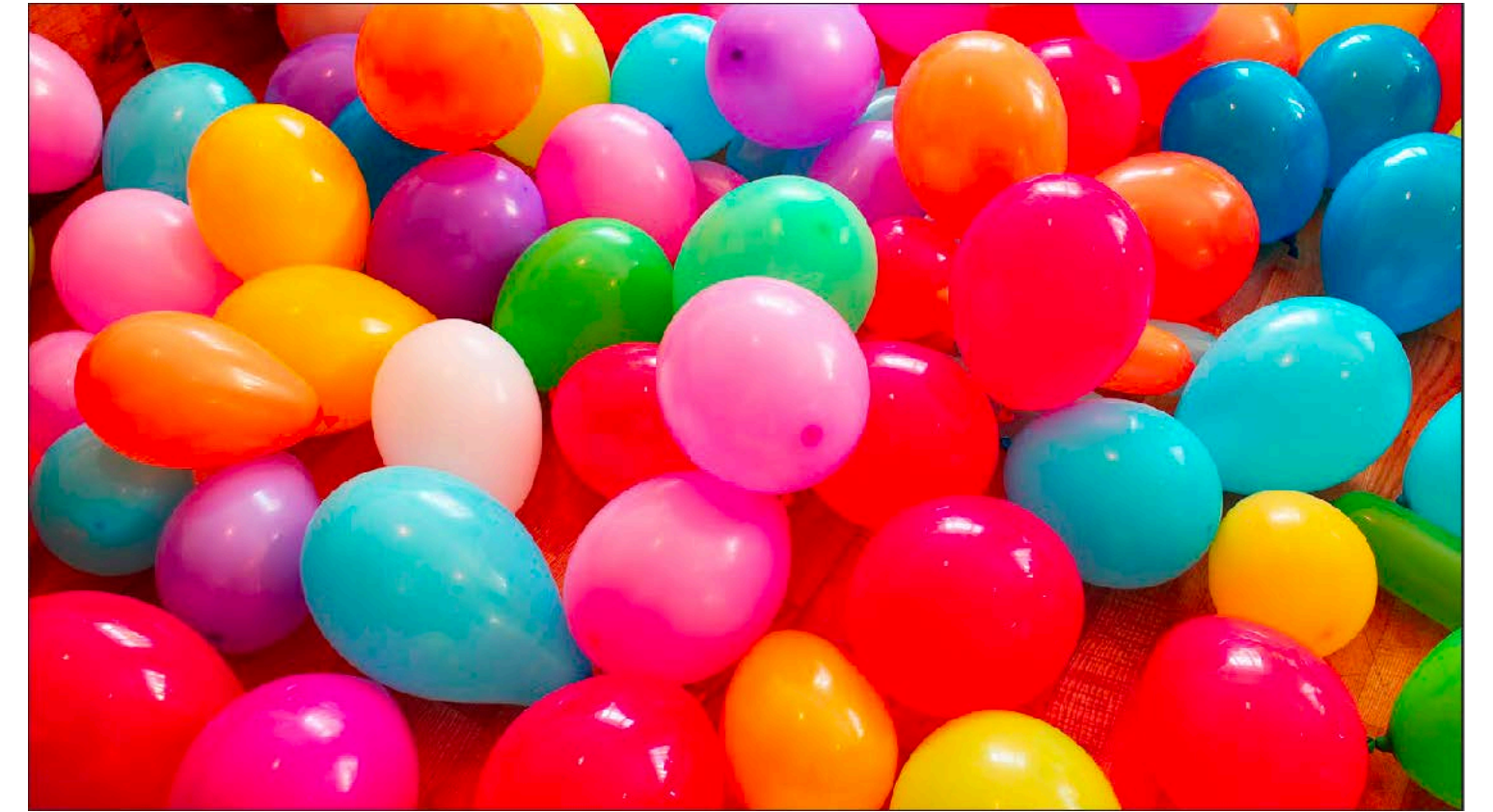
RGBs compared



sRGB



Adobe RGB (1998)



ProPhoto RGB

This is a simulation for the sake of comparison. The monitor/screen and the video card define how many colors can be displayed simultaneously.

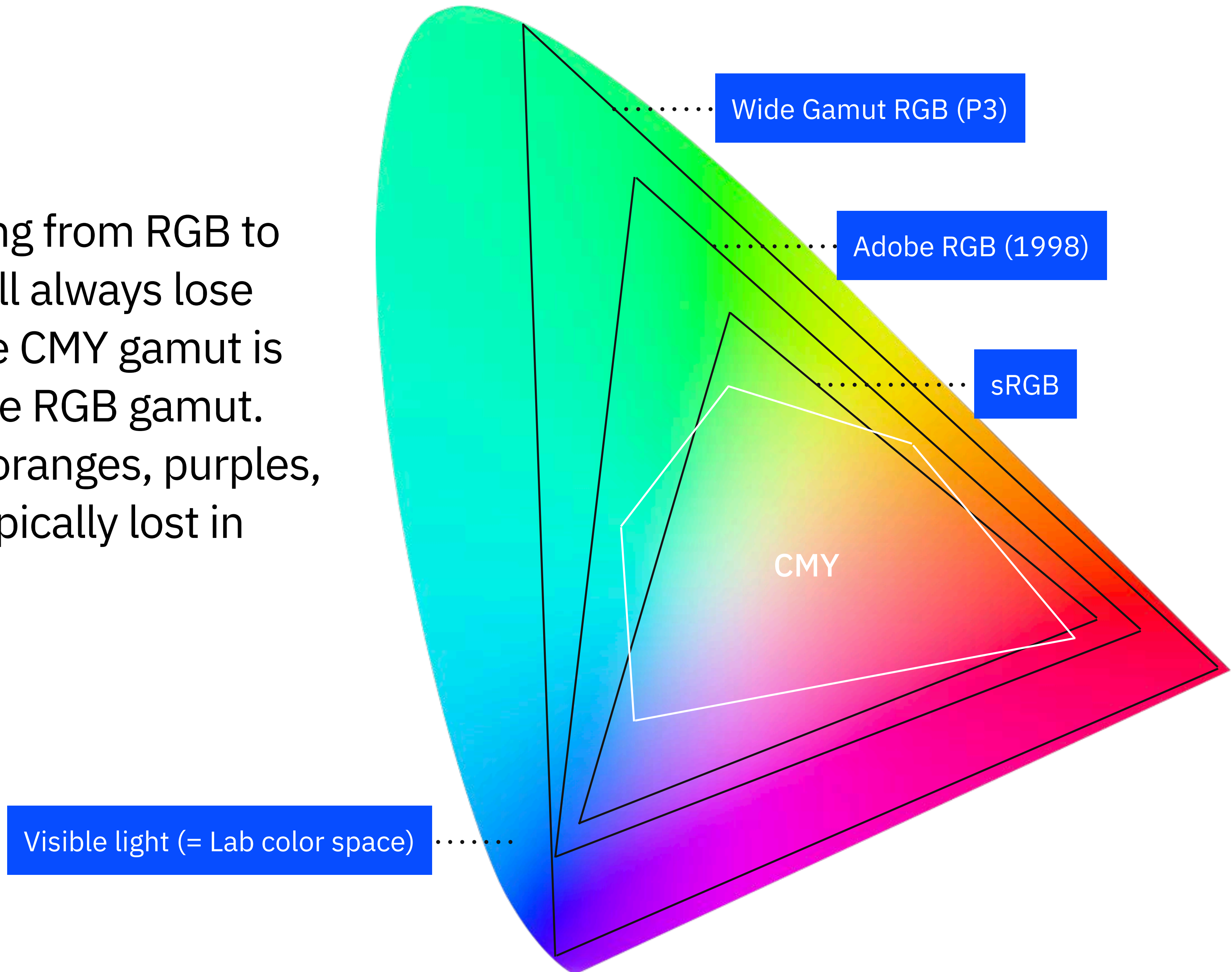


sRGB is the world's default color space. Use it and everything looks great everywhere, all the time. Adobe RGB should not be used unless you really know what you're doing. If you work in publishing, go right ahead and use it. If you have to ask, don't even try it.

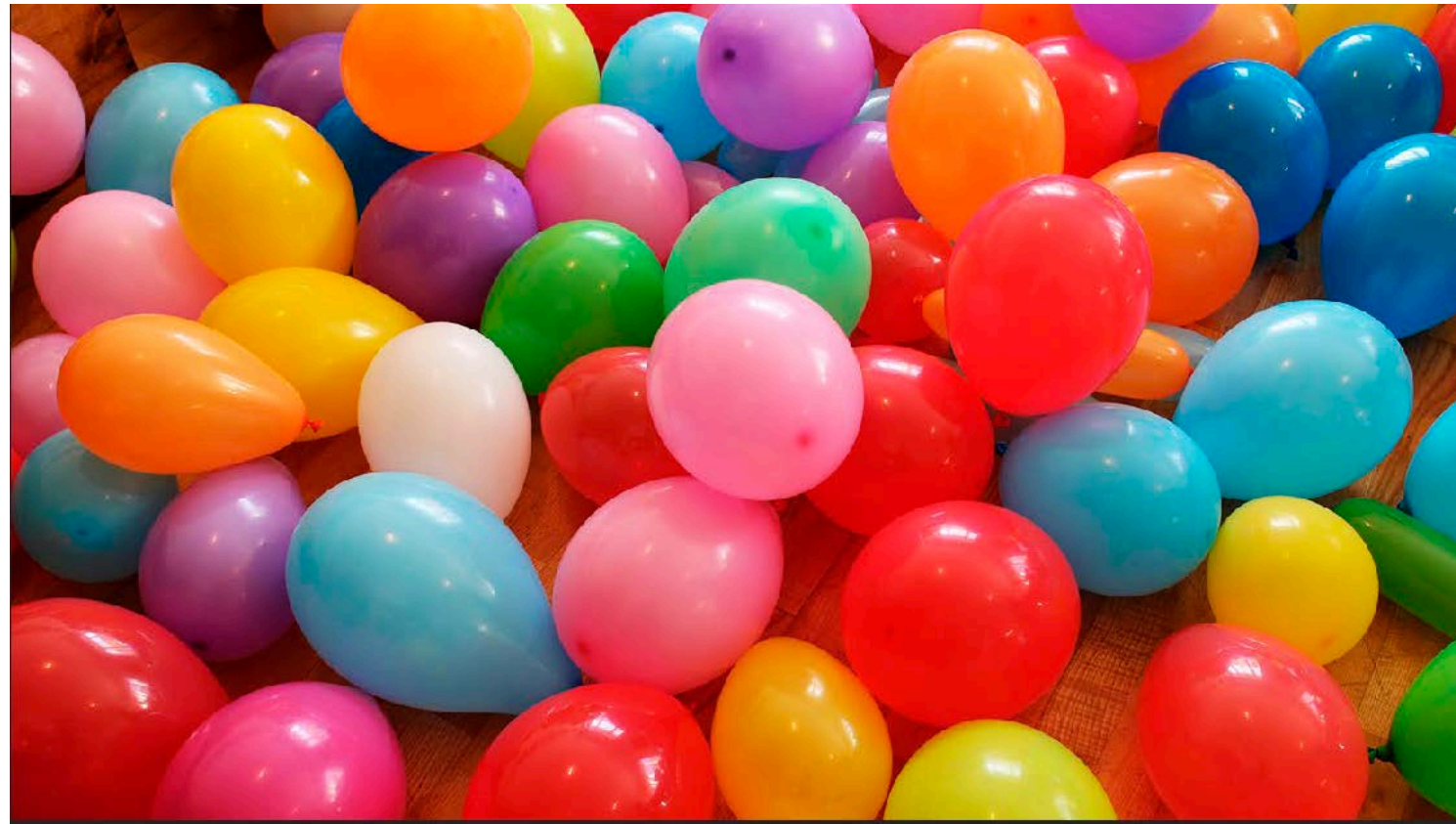
– Ken Rockwell (<https://kenrockwell.com/tech/adobe-rgb.htm>)

CMY(K)

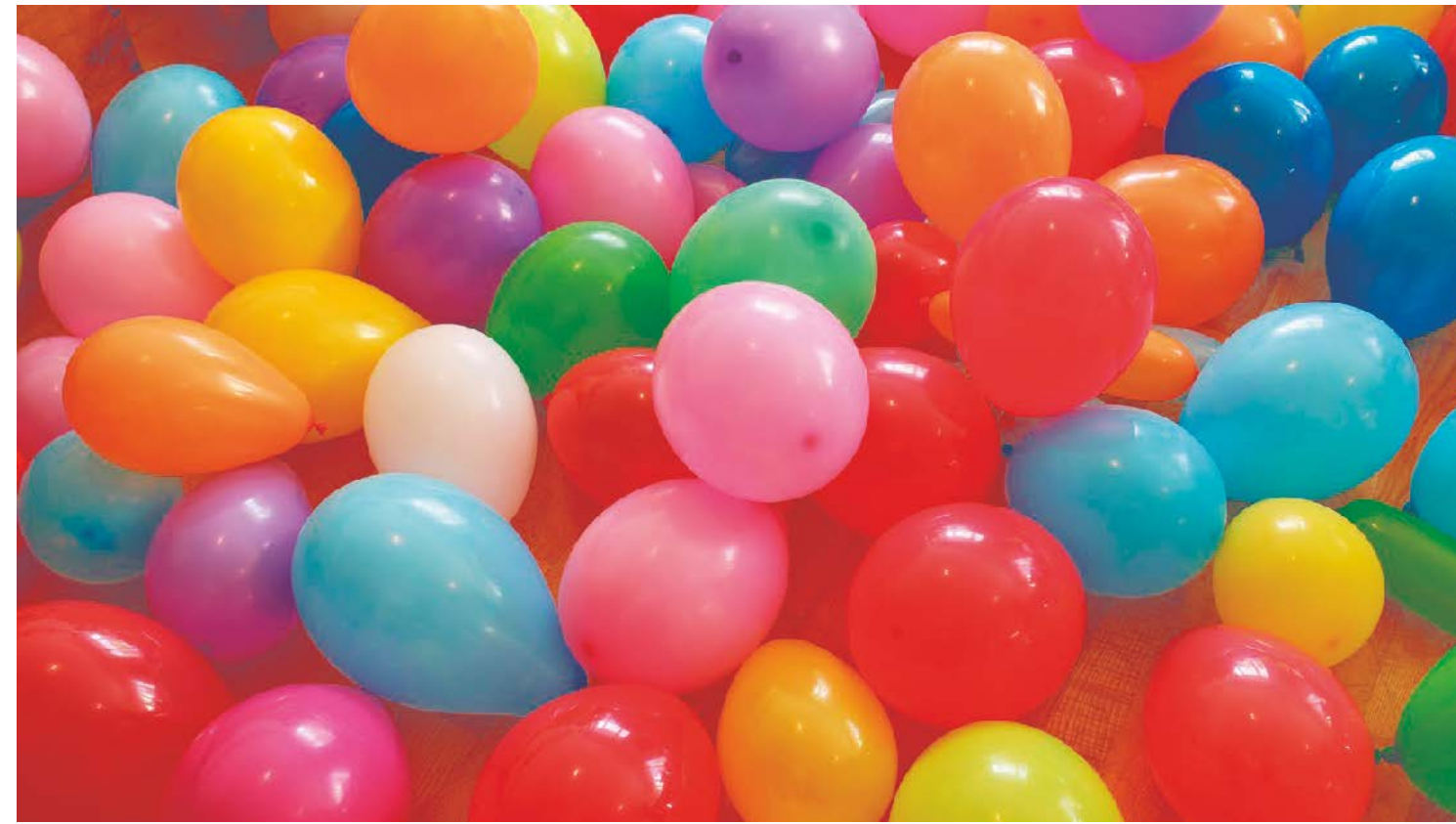
When converting from RGB to CMY(K), you will always lose colors since the CMY gamut is smaller than the RGB gamut. Bright greens, oranges, purples, and reds are typically lost in conversion.



Black = Key



Adobe RGB (1998)



CMY

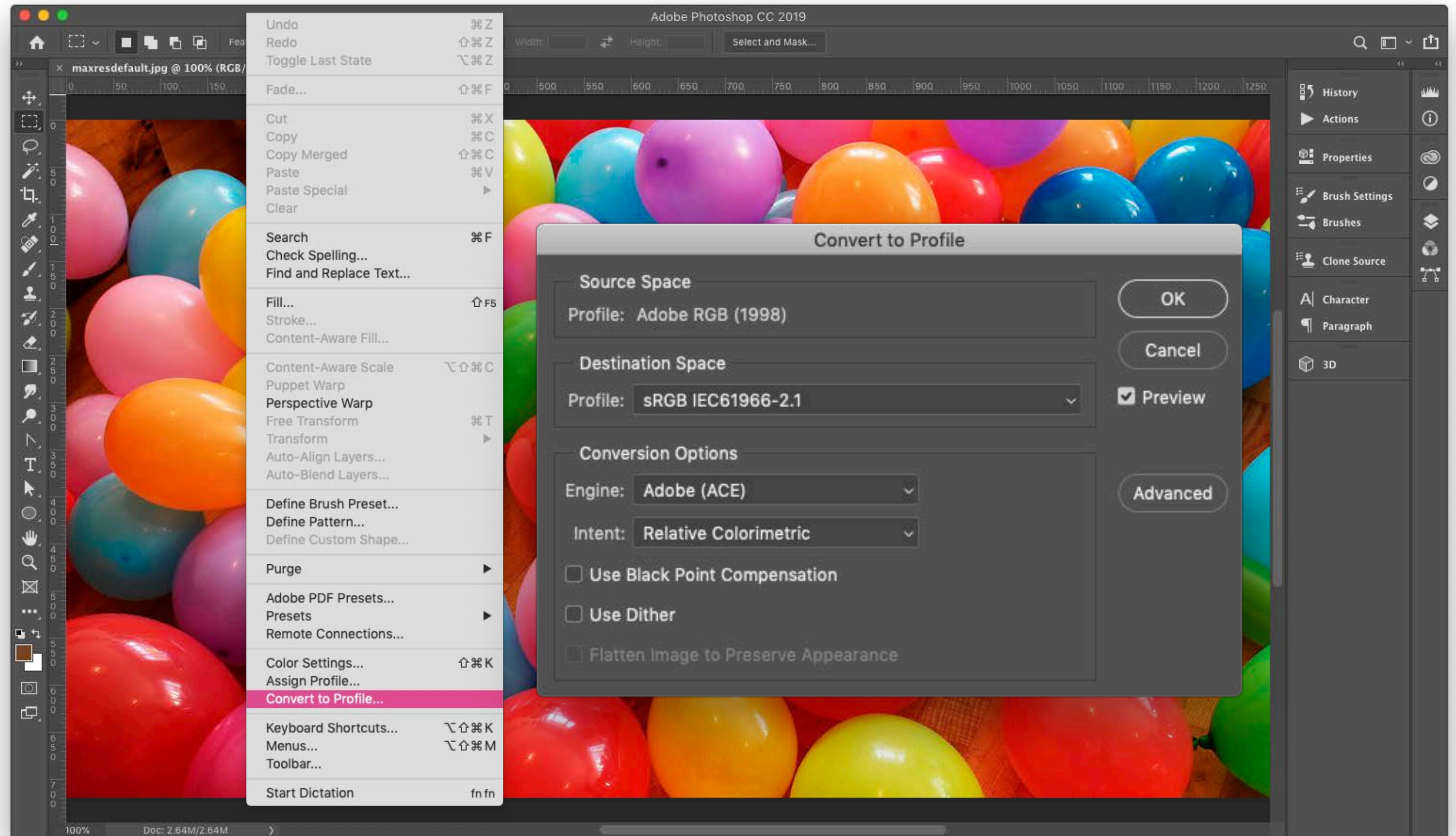
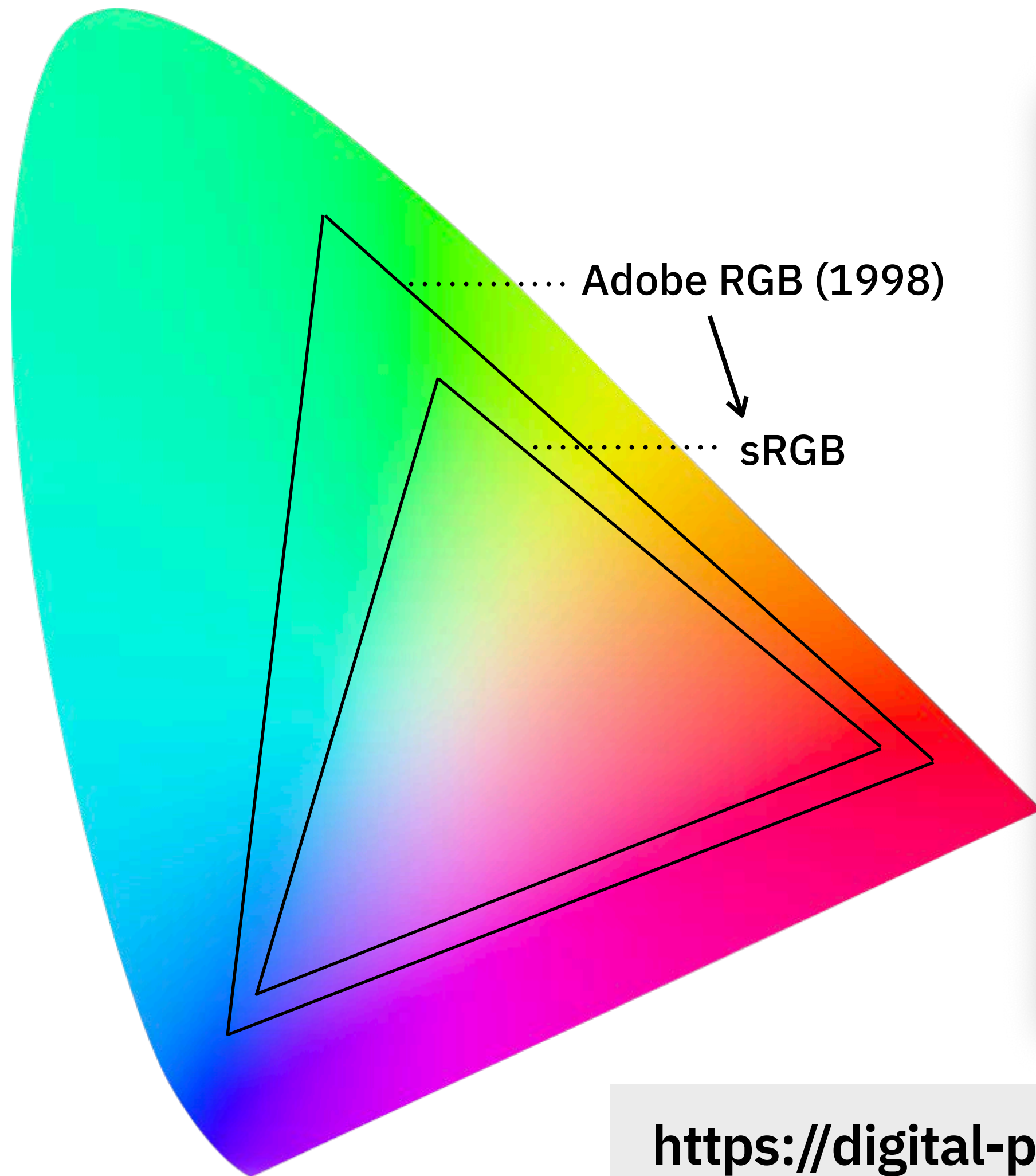


CMYK

DESIGN COUCH SESSIONS #01 : COLOR

Color conversion

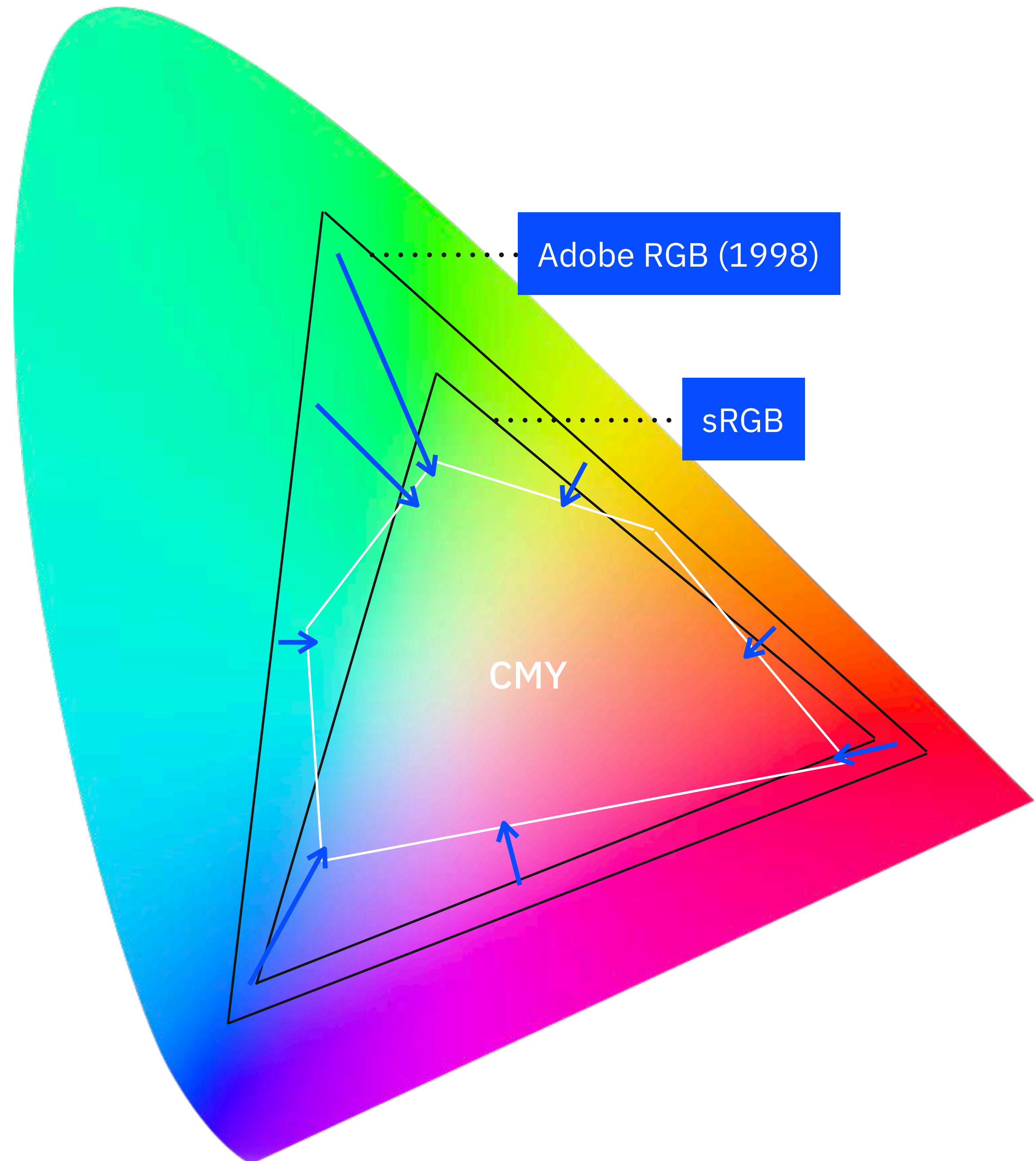
RGB to RGB



<https://digital-photography-school.com/6-color-settings-photoshop-need-know/>

RGB to CMY(K)

When converting from RGB to CMY(K), it's best to use at least Adobe RGB (1998) as color space since all CMY colours are contained within this gamut. The sRGB gamut is not completely compatible with the brightest color areas of CMY.





The best solution

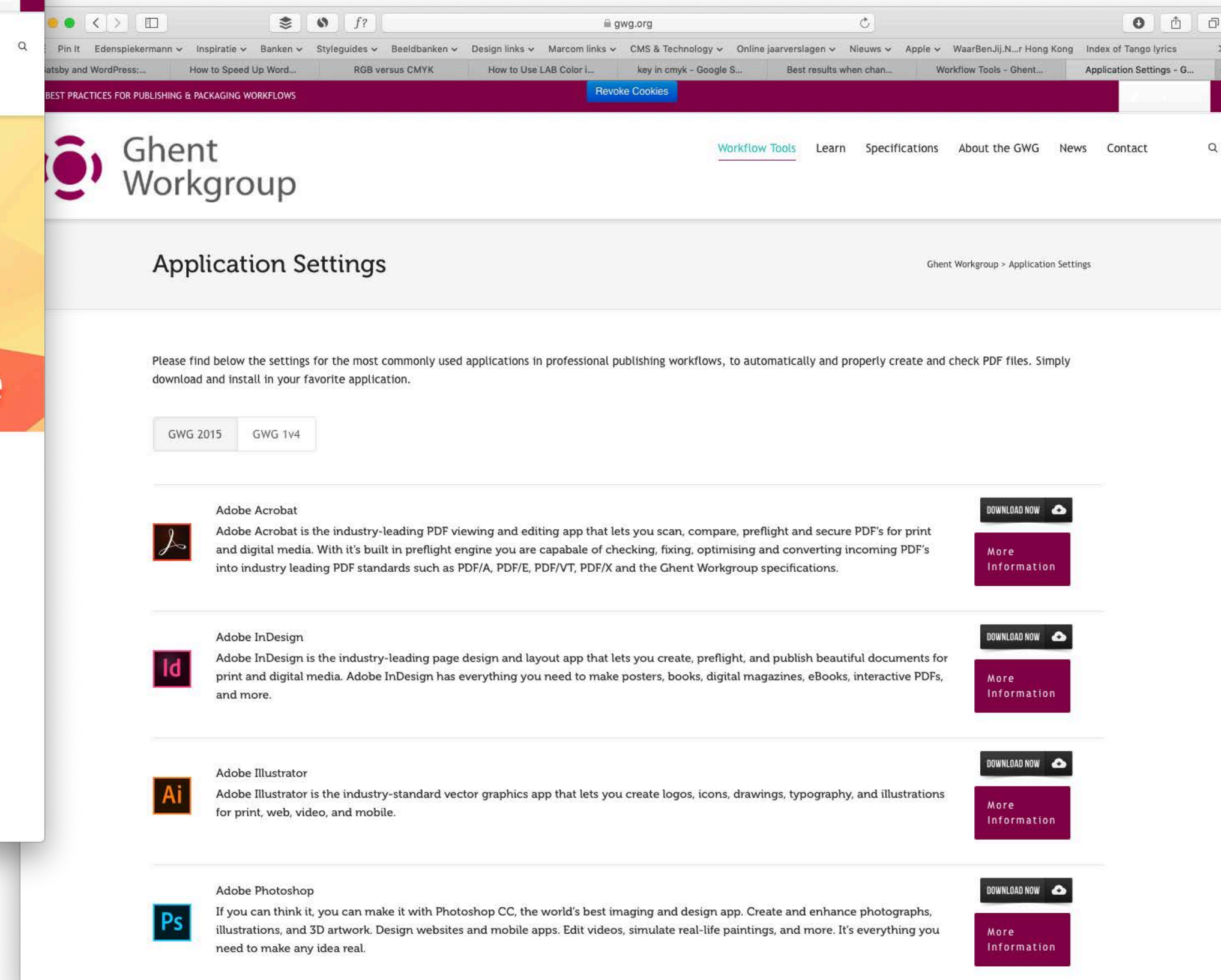
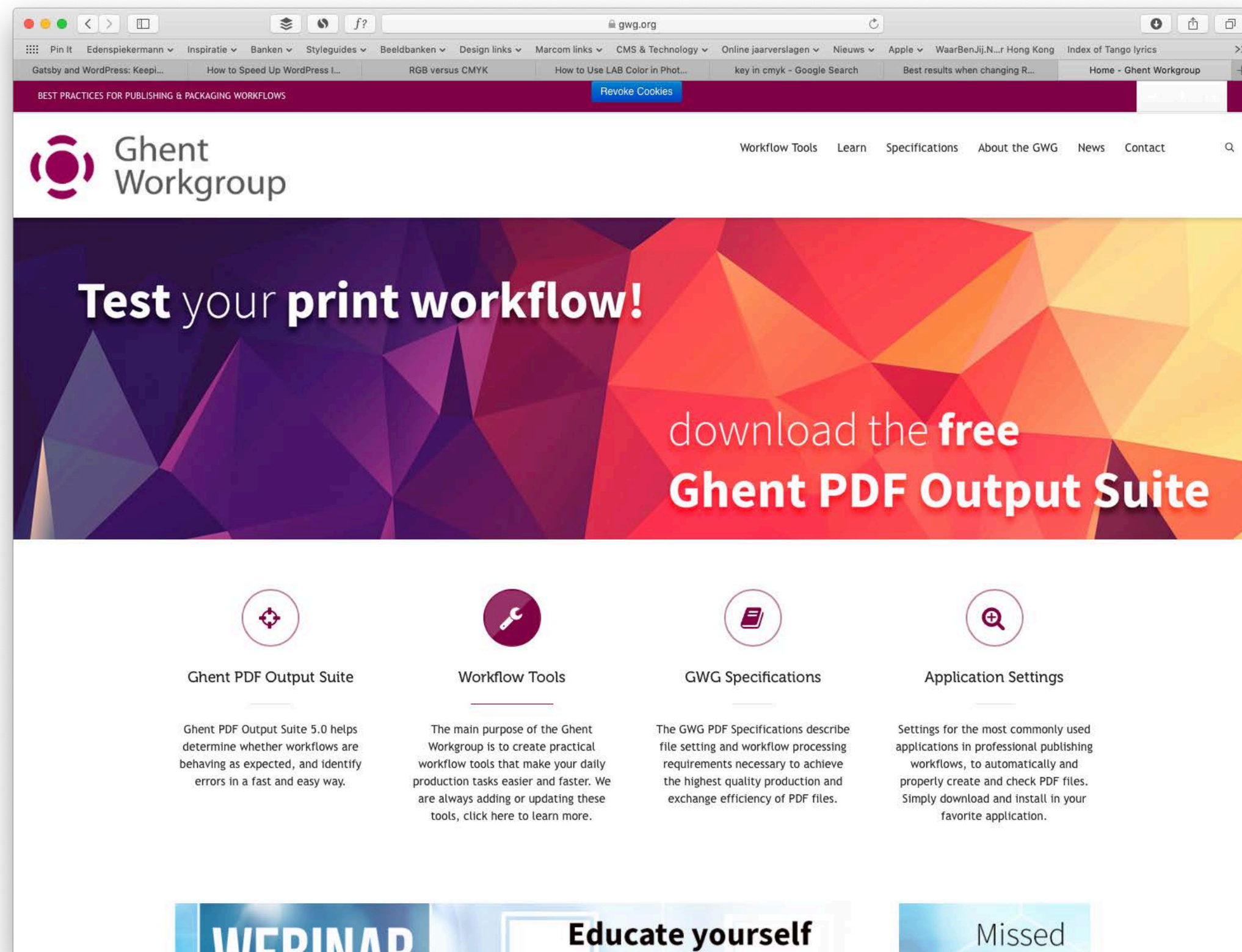
- Use Adobe RGB (1998) as color setting in Photoshop
- Use CMYK setting in Illustrator or InDesign
- Keep photographic images in RGB colours, don't convert them to CMYK in Photoshop. Even sRGB is often better than CMYK.
- Let the printing company do the conversion to CMYK (inks/toners)
- If you have to do it yourself – deliver print-ready PDFs – use the GWG2015 Application Settings... see next slides



Ghent Workgroup

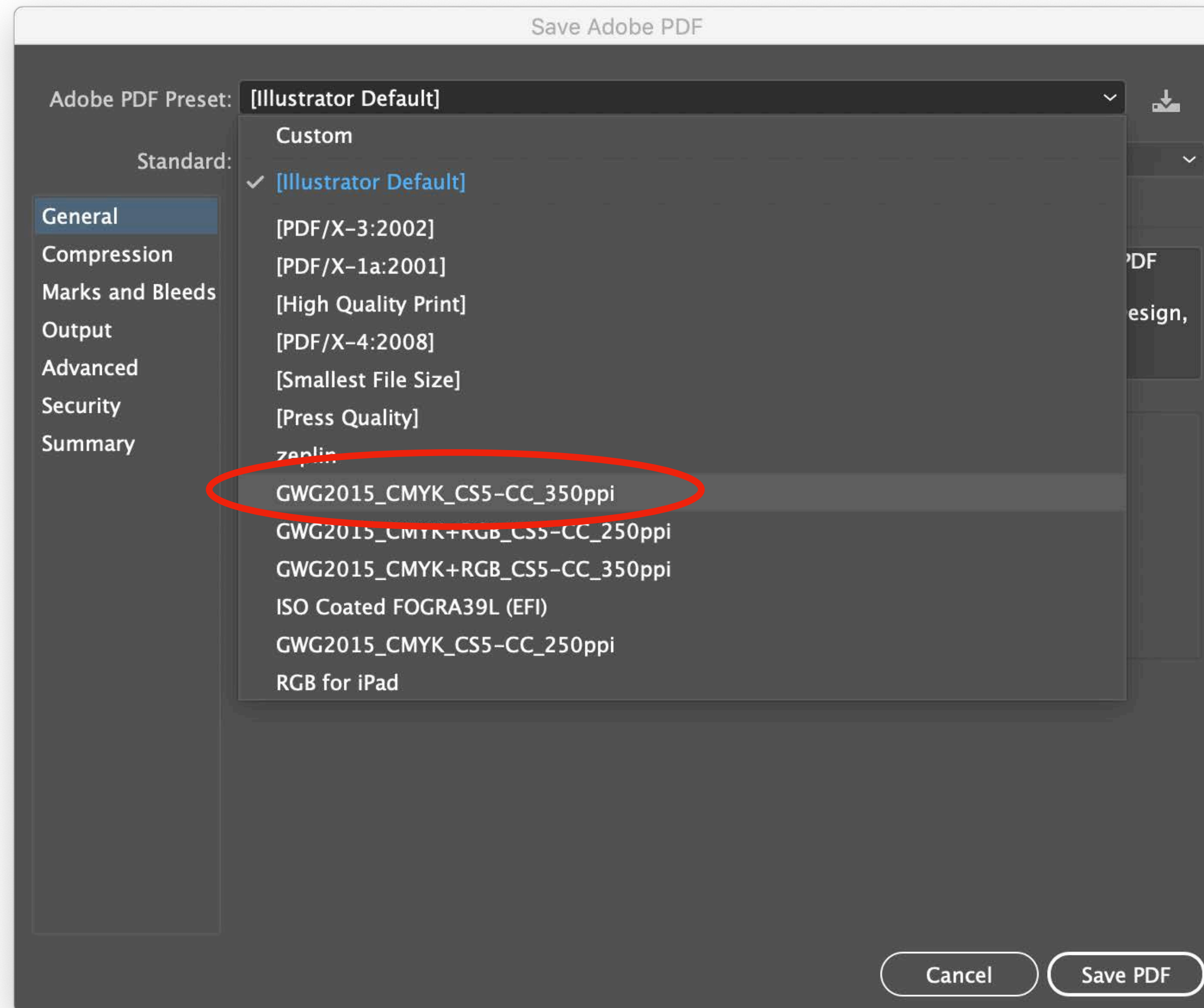
Print Specifications & Application Settings

<https://www.gwg.org/application-settings/>



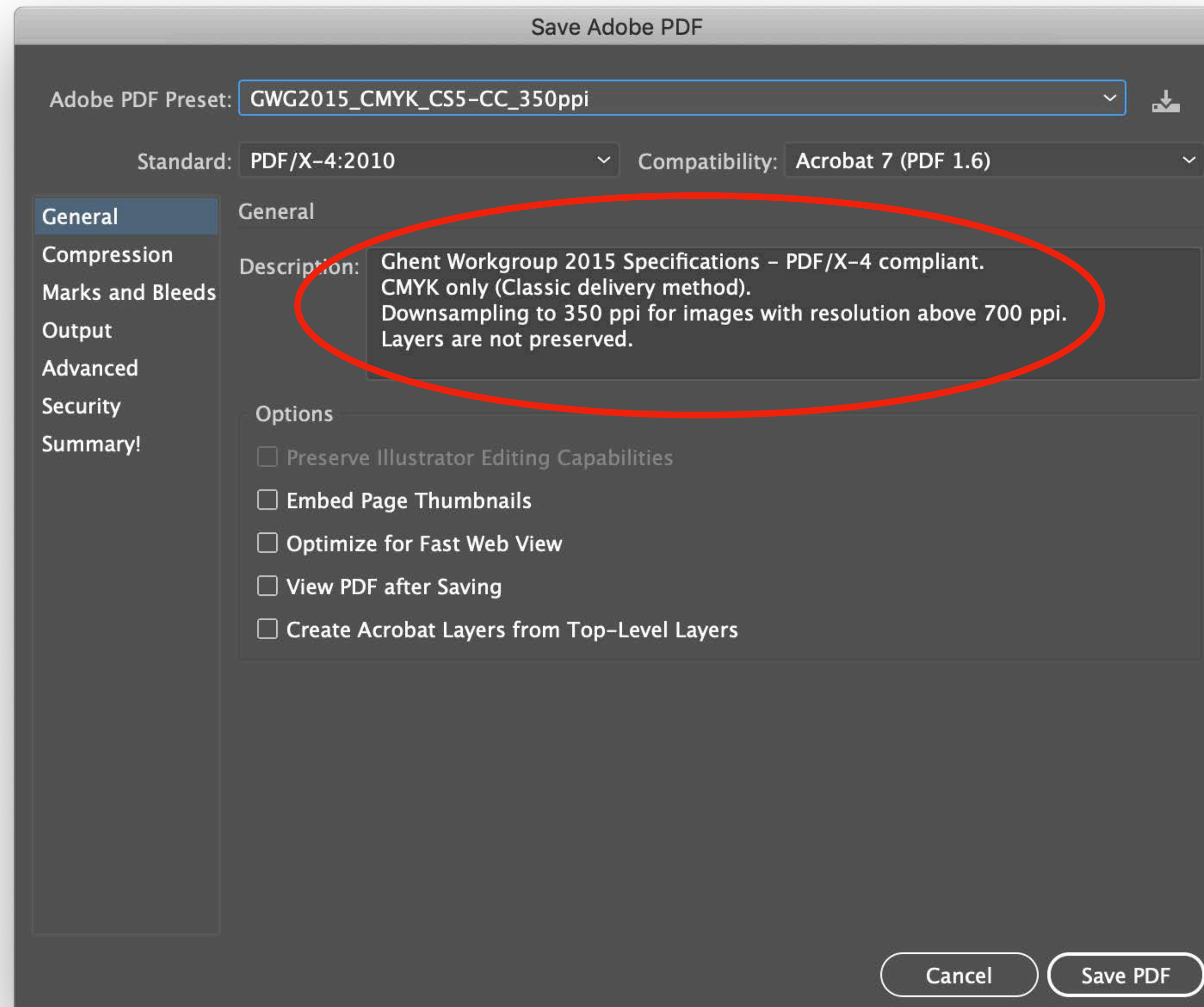


Print-ready PDF generation from Adobe CC



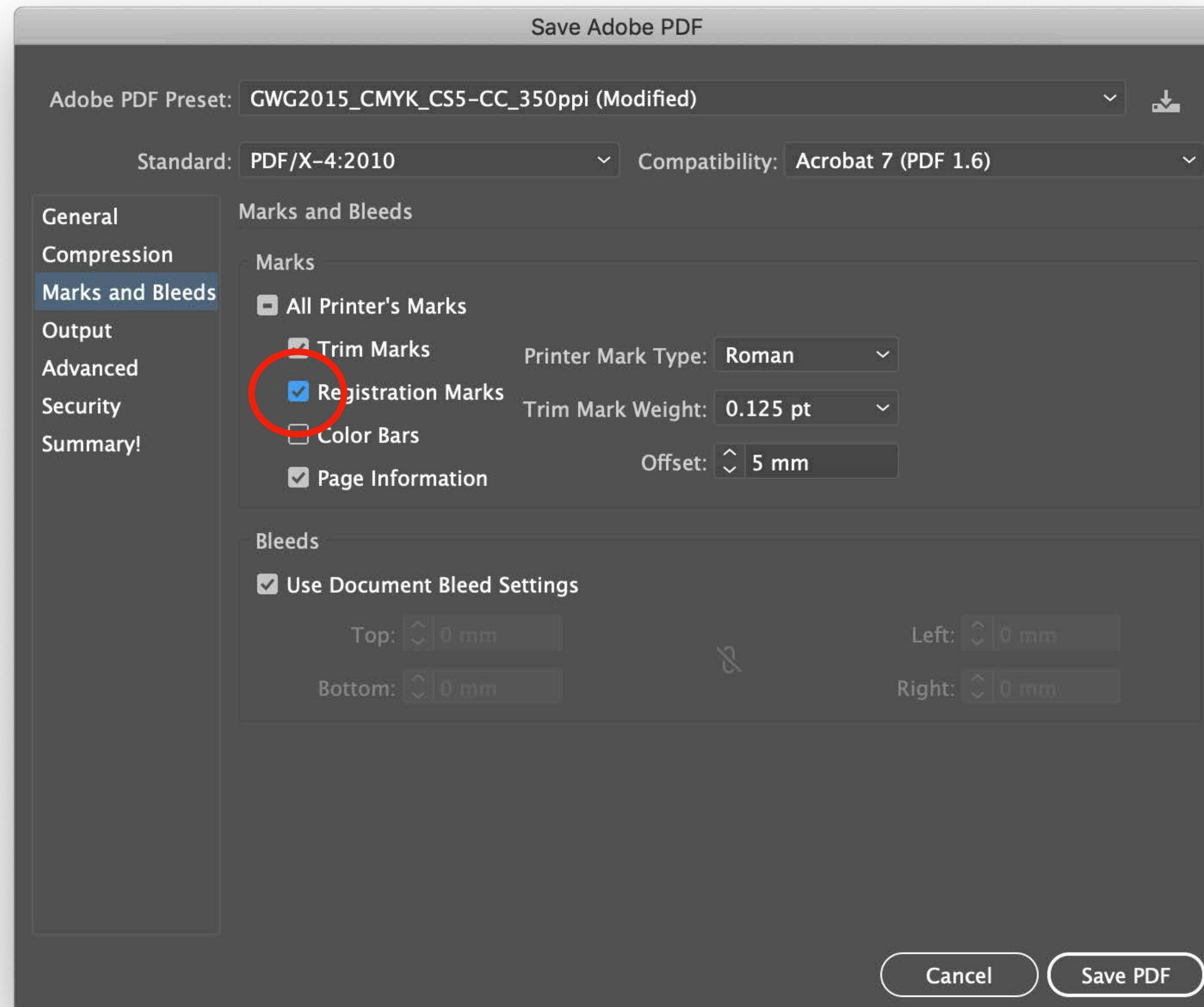


Print-ready PDF generation from Adobe CC





Print-ready PDF generation from Adobe CC





Print-ready PDF generation from Adobe CC

Save Adobe PDF

Adobe PDF Preset: **GWG2015_CMYK_CS5-CC_350ppi (Modified)**

Standard: **PDF/X-4:2010** Compatibility: **Acrobat 7 (PDF 1.6)**

General
Compression
Marks and Bleeds
Output
Advanced
Security
Summary!

Output

Color

Color Conversion: **Convert to Destination (Preserve Numbers)**

Destination: **Working CMYK - Coated FOGRA39 (ISO 12647-2:2004)**

Profile Inclusion Policy: **Include Destination Profiles**

PDF/X

Output Intent Profile Name: **Working CMYK - Coated FOGRA39 (ISO 12647-2:2004)**

Output Condition Name: **Printing according ISO12647**

Output Condition Identifier:

Registry Name:

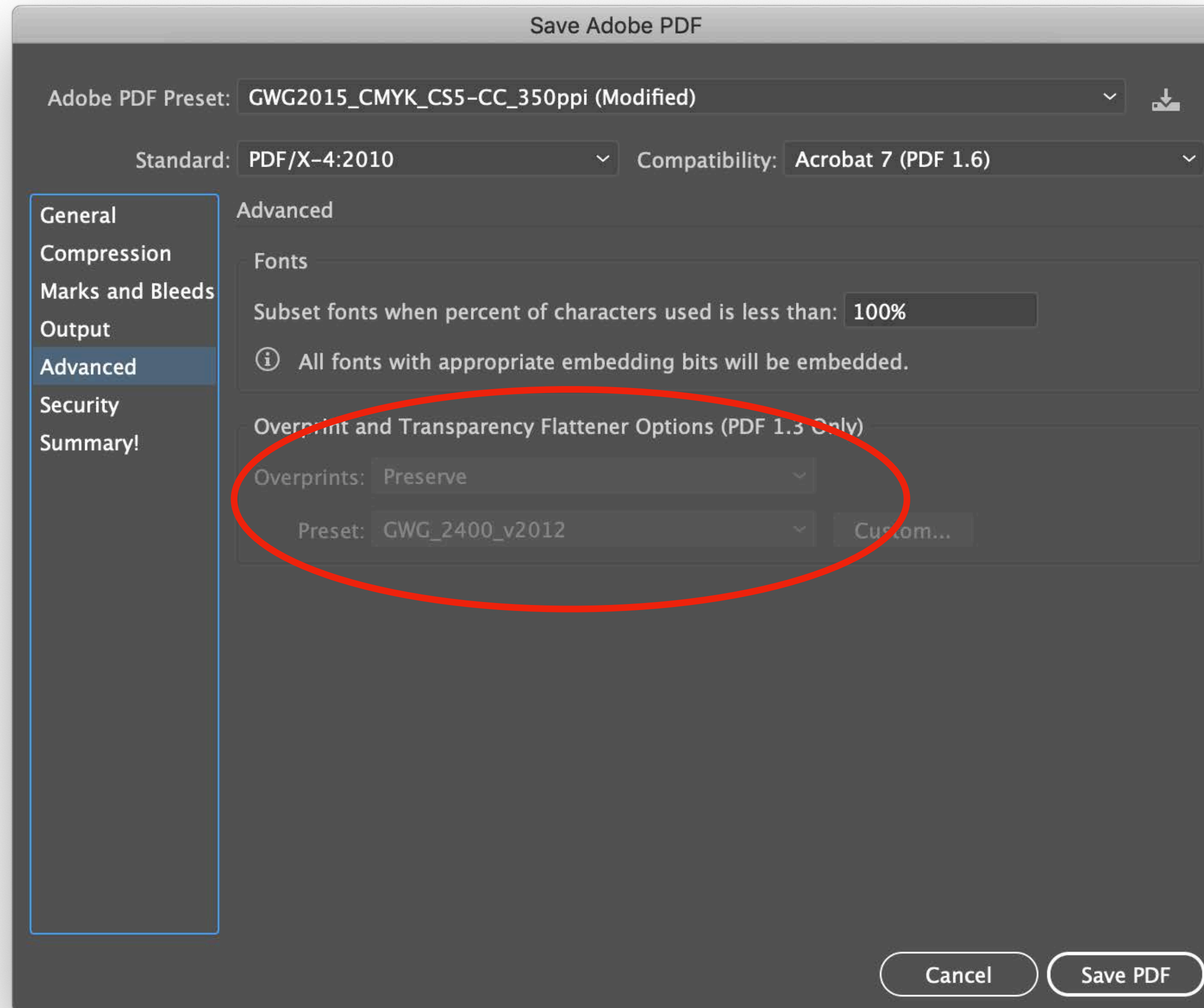
Mark as Trapped

Description

Cancel Save PDF



Print-ready PDF generation from Adobe CC



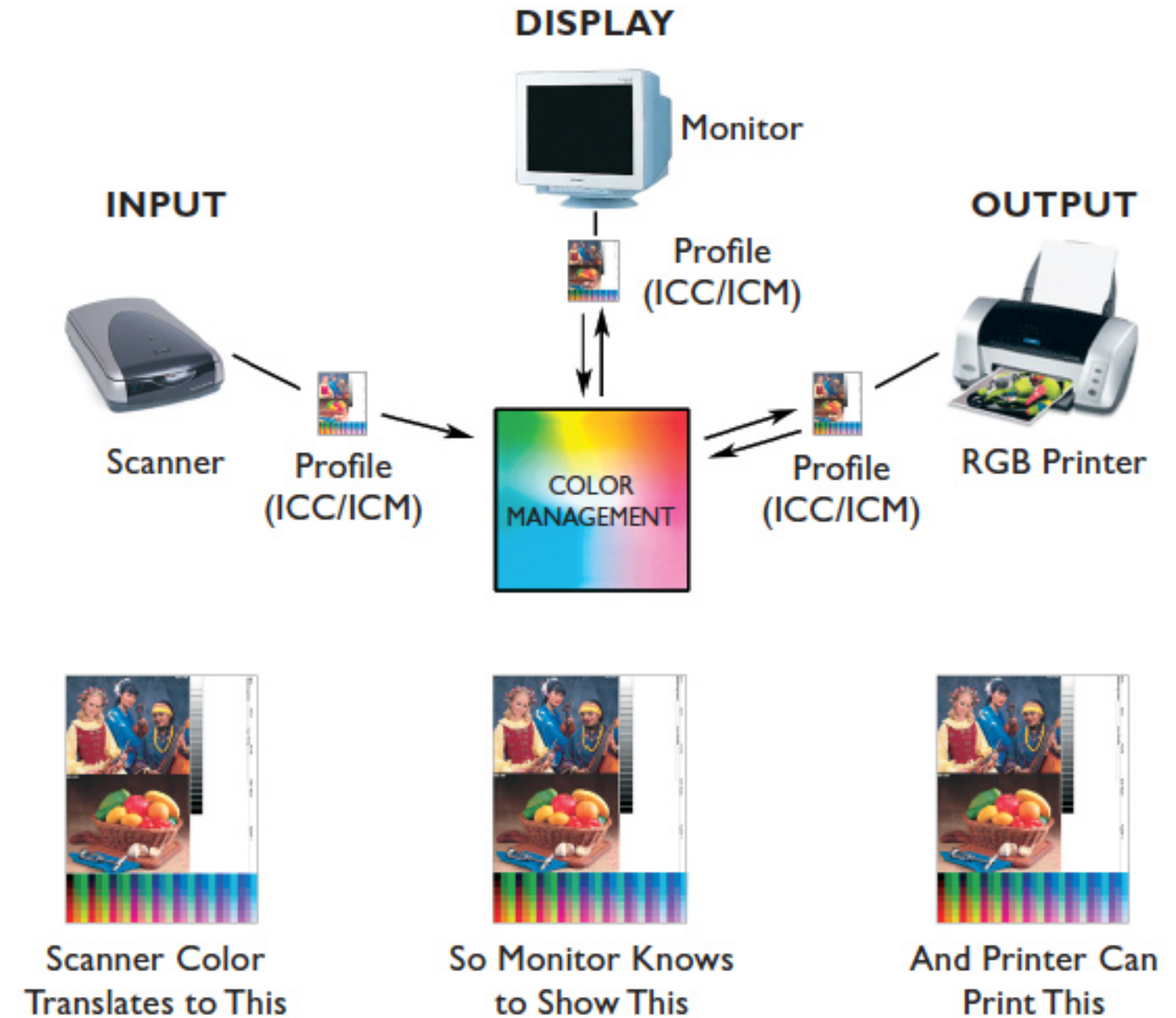
DESIGN COUCH SESSIONS #01 : COLOR

Color management

Color management workflow

The purpose of a managed color workflow or color management system is to provide color consistency and predictability throughout the entire workflow.

In order to achieve this consistency and predictability, we use ICC/ICM color profiles for every device in the chain.

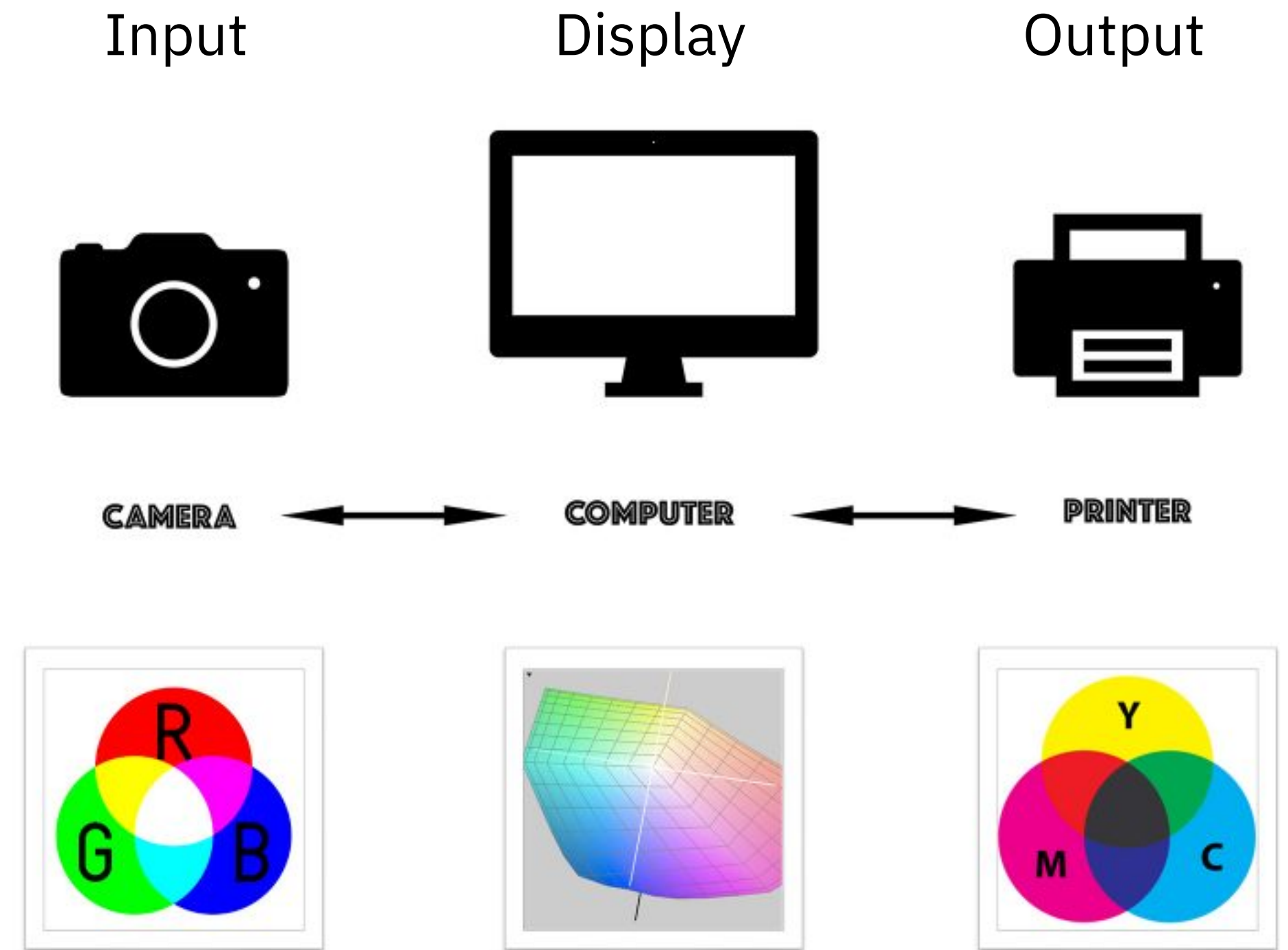


Input and output devices

scan > view > edit > proof > reproduce

Scanners, computer monitors, printers; they all speak different color ‘languages’. Consider the ICC profiles to be the ‘translators’ or interpreters that help to maintain the appearance of colors between devices.

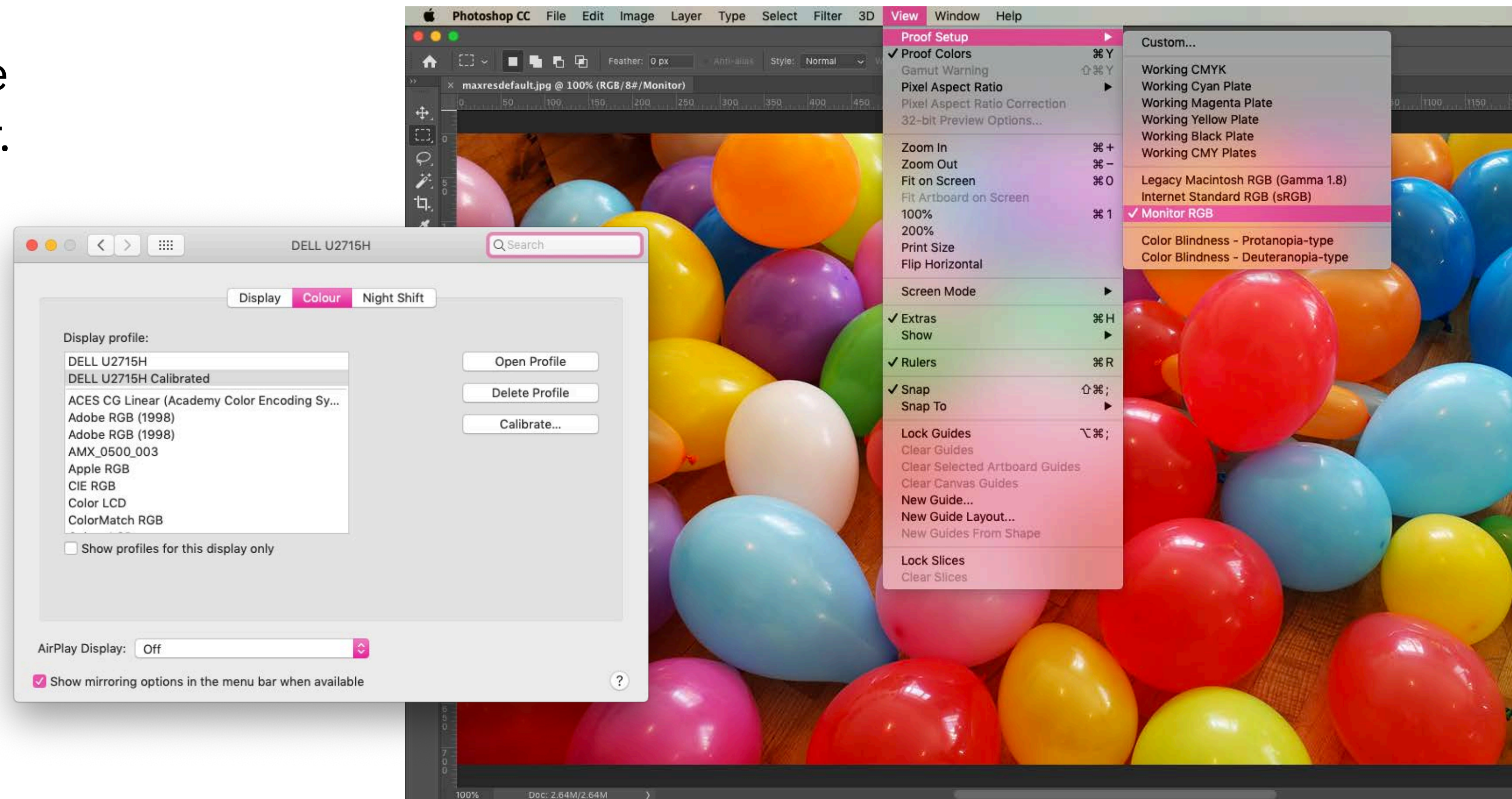
- Input profiles are for scanners and cameras
- Display profiles are for monitors (screens)
- Output profiles are for laser/inkjet printers and offset presses and are substrate related. Glossy paper needs a different profile than matte paper.



More here: <https://www.colourmanagement.net/advice/about-icc-colour-profiles>

Display settings - best practise

- Set your display color profile to the proper ICC profile for your monitor.
- Make sure you select Proof Setup > Monitor RGB in Photoshop or Illustrator



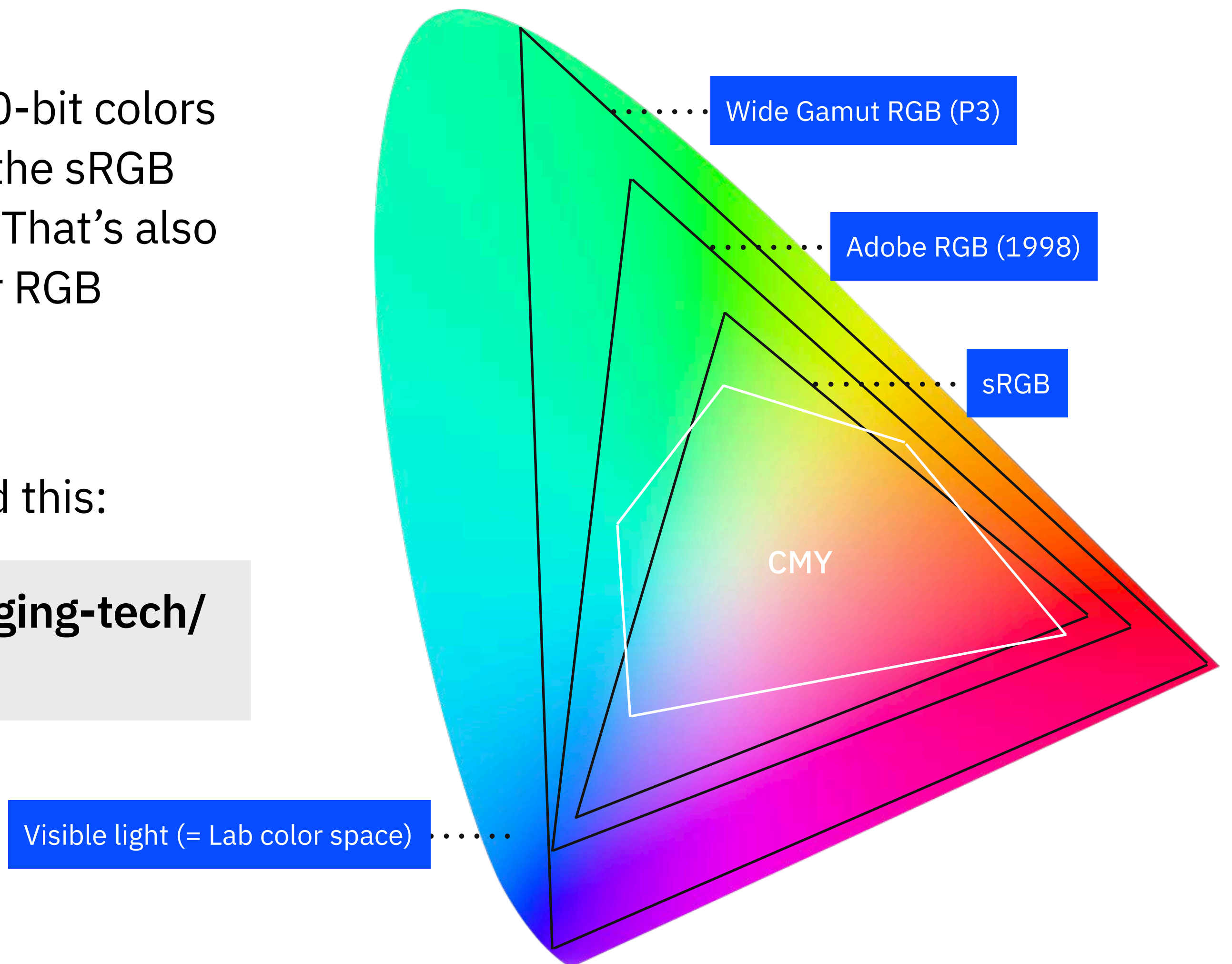
More here: <https://digital-photography-school.com/6-color-settings-photoshop-need-know/>

Judging color on your screen

Apple Retina Screens nowadays can display 10-bit colors (Display P3 or ‘wide gamut’). This means that the sRGB standard (8-bits color) doesn’t cut it anymore. That’s also why it’s wise to use Adobe RGB (1998) as your RGB workspace setting in Photoshop.

If you want to learn more about this topic, read this:

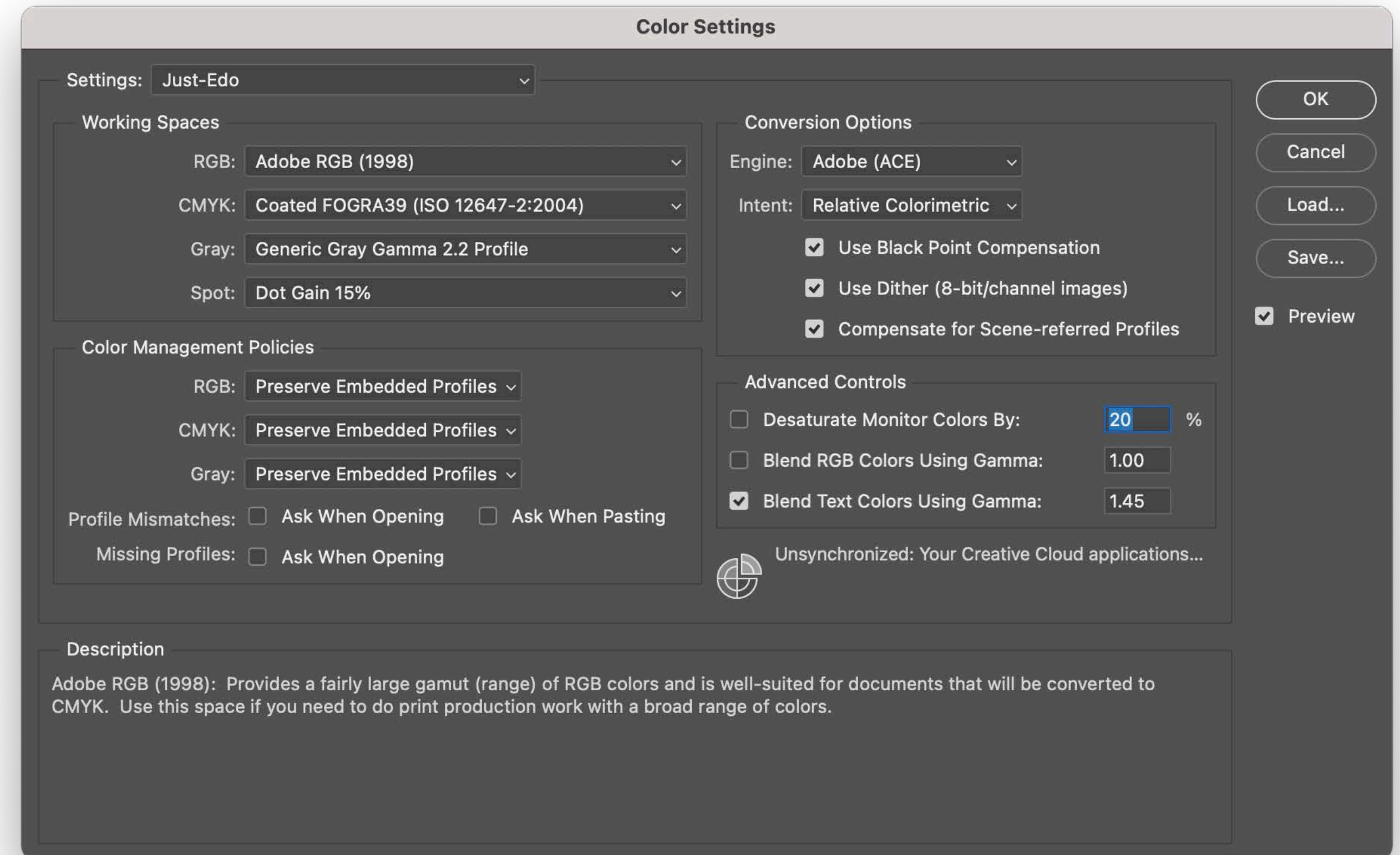
<https://www.digitalphotopro.com/gear/imaging-tech/apples-wide-color/>





Color settings in Adobe CC applications

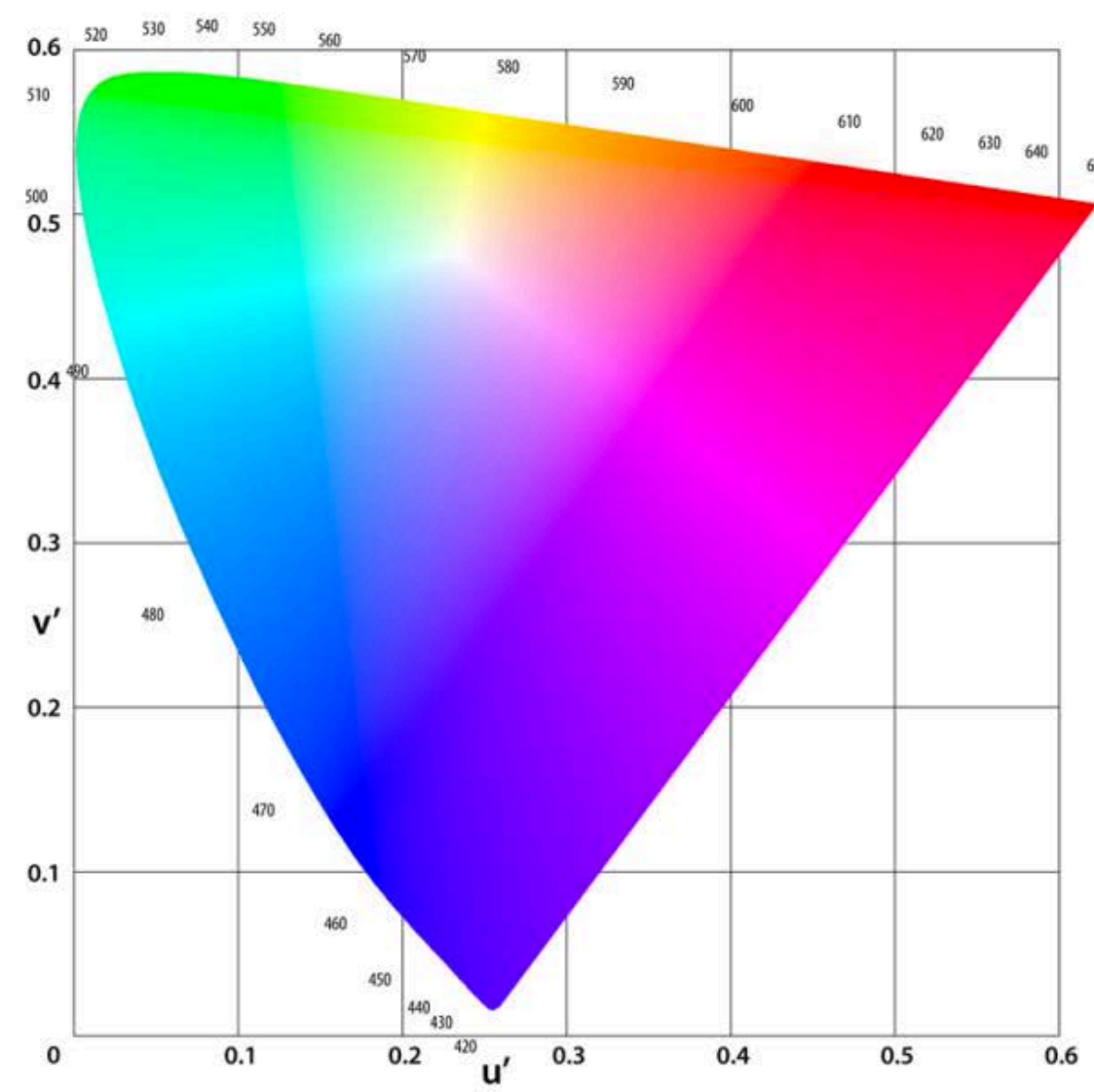
Use these color settings in Photoshop, InDesign and Illustrator for the best day to day experience.



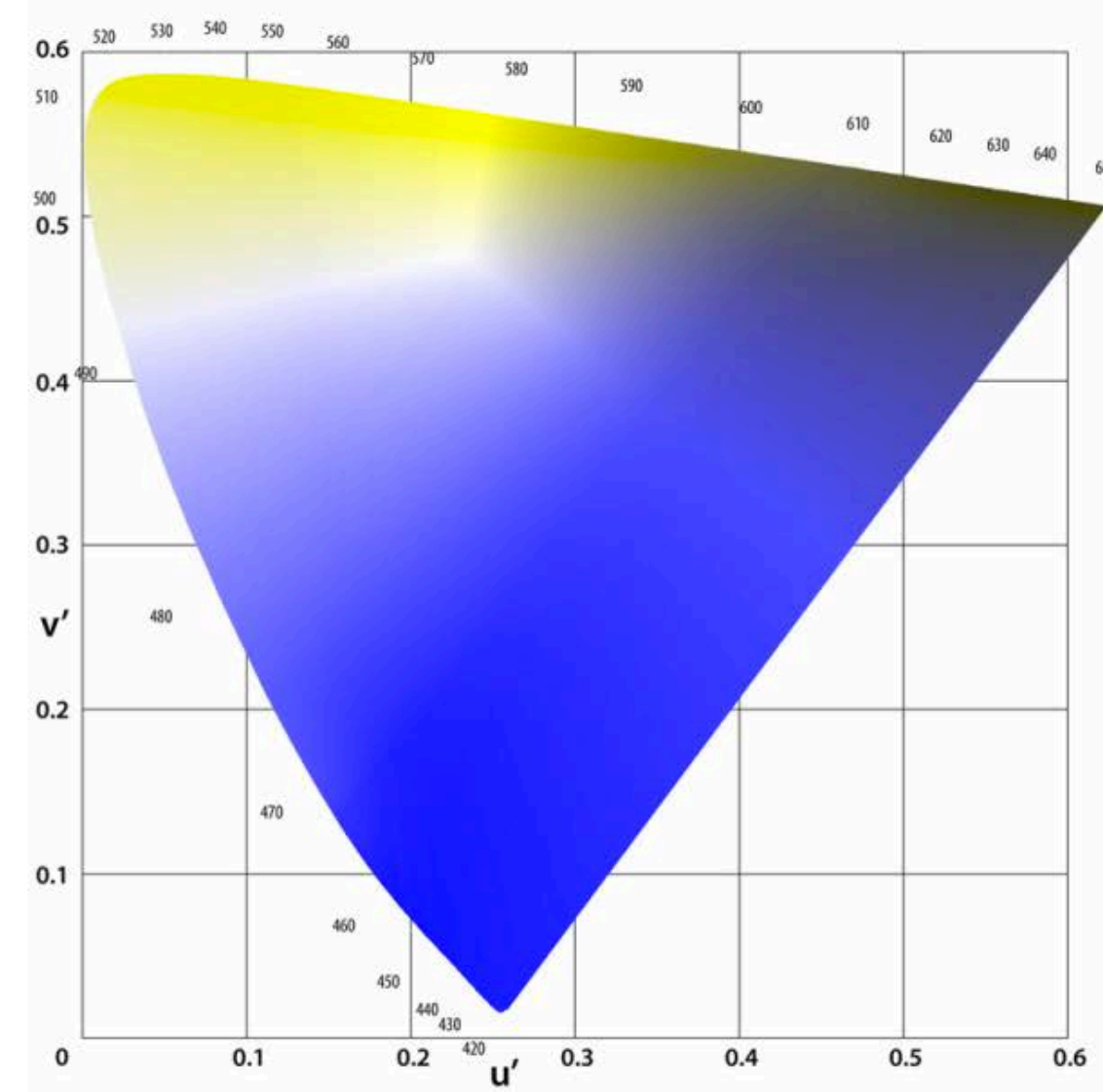
DESIGN COUCH SESSIONS #01 : COLOR

Color impaired

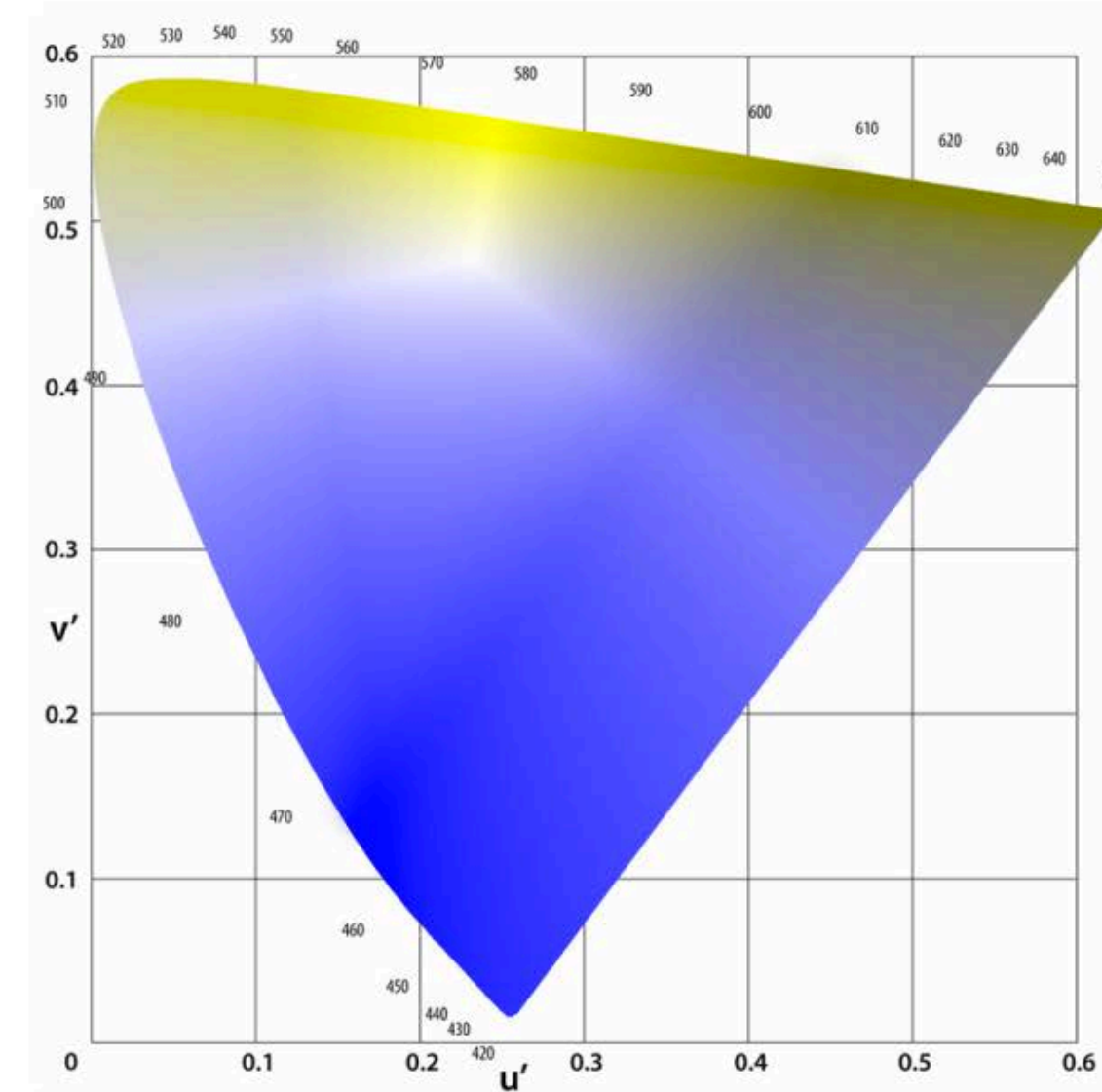
Design for the color impaired



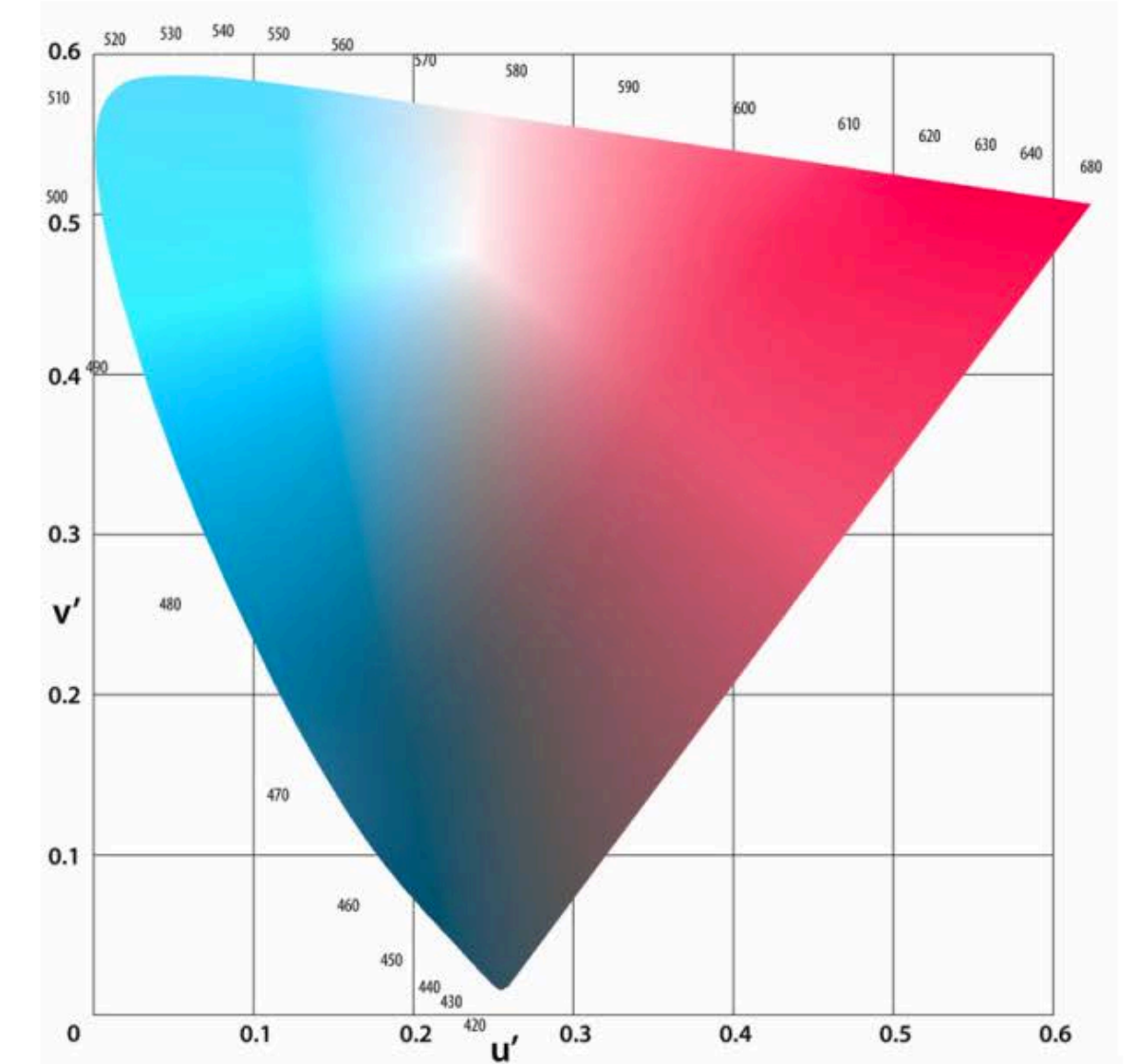
Normal vision



Protanopia



Deuteranopia



Tritanopia

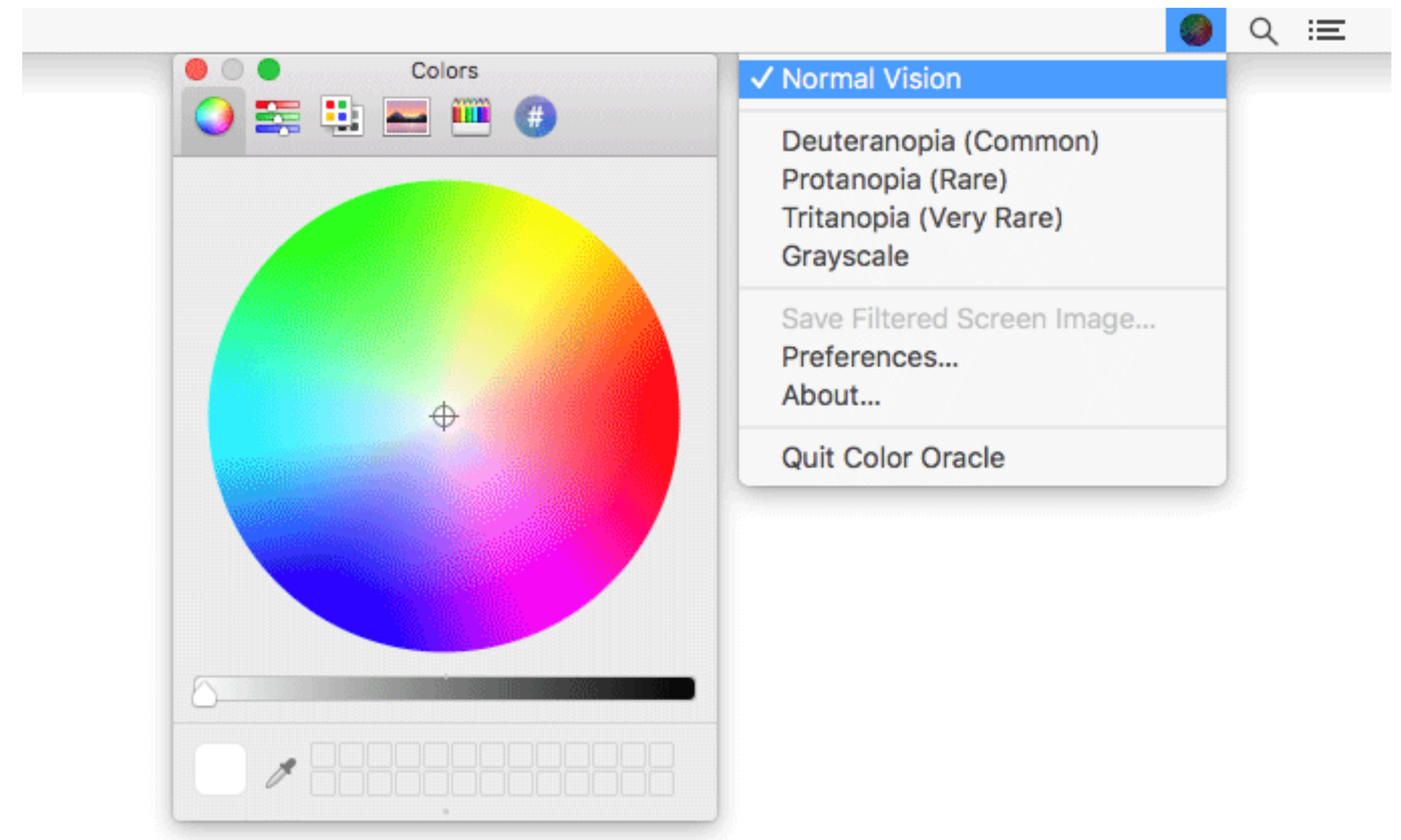
The 3 types of color 'blindness'

Design for the color impaired

Color Oracle is a free color blindness simulator for Windows, Mac and Linux. It takes the guesswork out of designing for color blindness by showing you in real time what people with common color vision impairments will see.

<http://colororacle.org/index.html>

http://colororacle.org/resources/2007_JennyKelso_ColorDesign_hires.pdf



DESIGN COUCH SESSIONS #01 : COLOR

Color inspiration

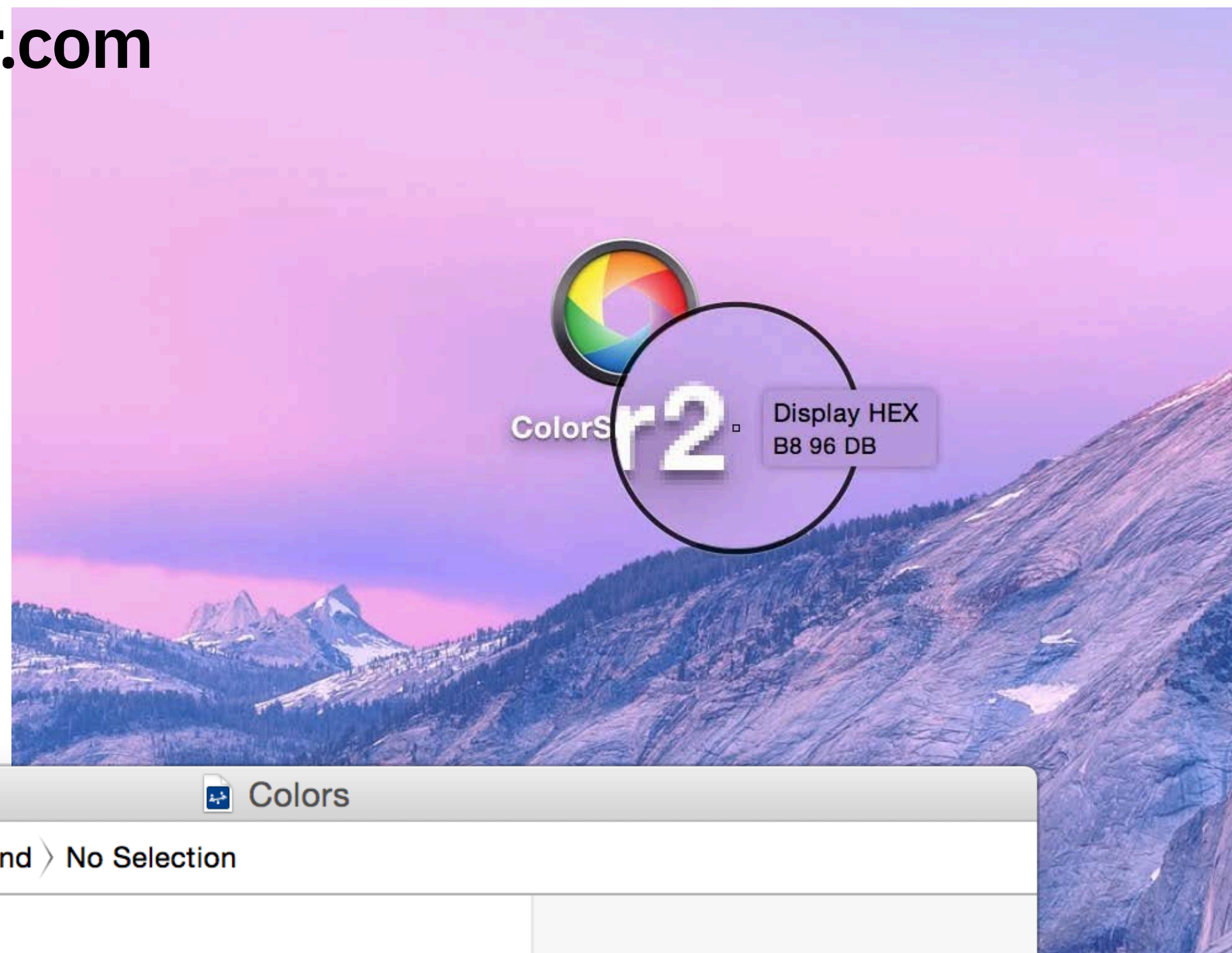
colorhunt.co

The screenshot shows the Color Hunt website interface. At the top, there's a navigation bar with the Color Hunt logo, 'Palettes', and a 'New' dropdown menu. Below this is a grid of 12 color palette cards, each featuring five distinct color swatches. Each card includes a heart icon representing the number of likes and a timestamp indicating when it was posted. The palettes vary in color schemes, including combinations of blues, oranges, pinks, and greens. To the right of the grid is a sidebar containing a search bar labeled 'Search Palettes', a section titled 'Color Palettes for Designers and Artists' with a brief description of the platform, a 'Get our Chrome extension' button, and a 'Made with ❤️ by Gal Shir' credit.

Color Palette	Likes	Time
Dark blue, purple, orange, yellow, light blue	30	Today
Light blue, coral, red, dark blue	89	Yesterday
Pink, light green, yellow, light pink	92	2 days
Light grey, teal, dark teal, orange	112	3 days
Red, orange, yellow, green	223	4 days
Yellow, pink, purple, light purple	143	5 days
Dark red, red, orange, green	201	6 days
Pink, magenta, light pink, light pink	155	1 week
Light beige, teal, red, dark purple	258	1 week
Light blue, light green, yellow, orange, light orange	422	1 week
Dark blue, dark blue, red, yellow	458	1 week
Yellow, light green, green, dark green	273	1 week



colorsnapper.com



ColorSnapper 2 allows you to match the color export format to your coding style. Along with all new supported formats, including Generic, CSS, NSColor, UIColor, Swift, Android, Java, .NET, CGColor, and OpenGL this results in even faster developer workflow.



```

import Cocoa

// ColorSnapper1
var color1 = NSColor(red:0.863, green:0.078, blue:0.235, alpha:1)
var color2 = NSColor(red:0.855, green:0.102, blue:0.251, alpha: 1)
color1 == color2

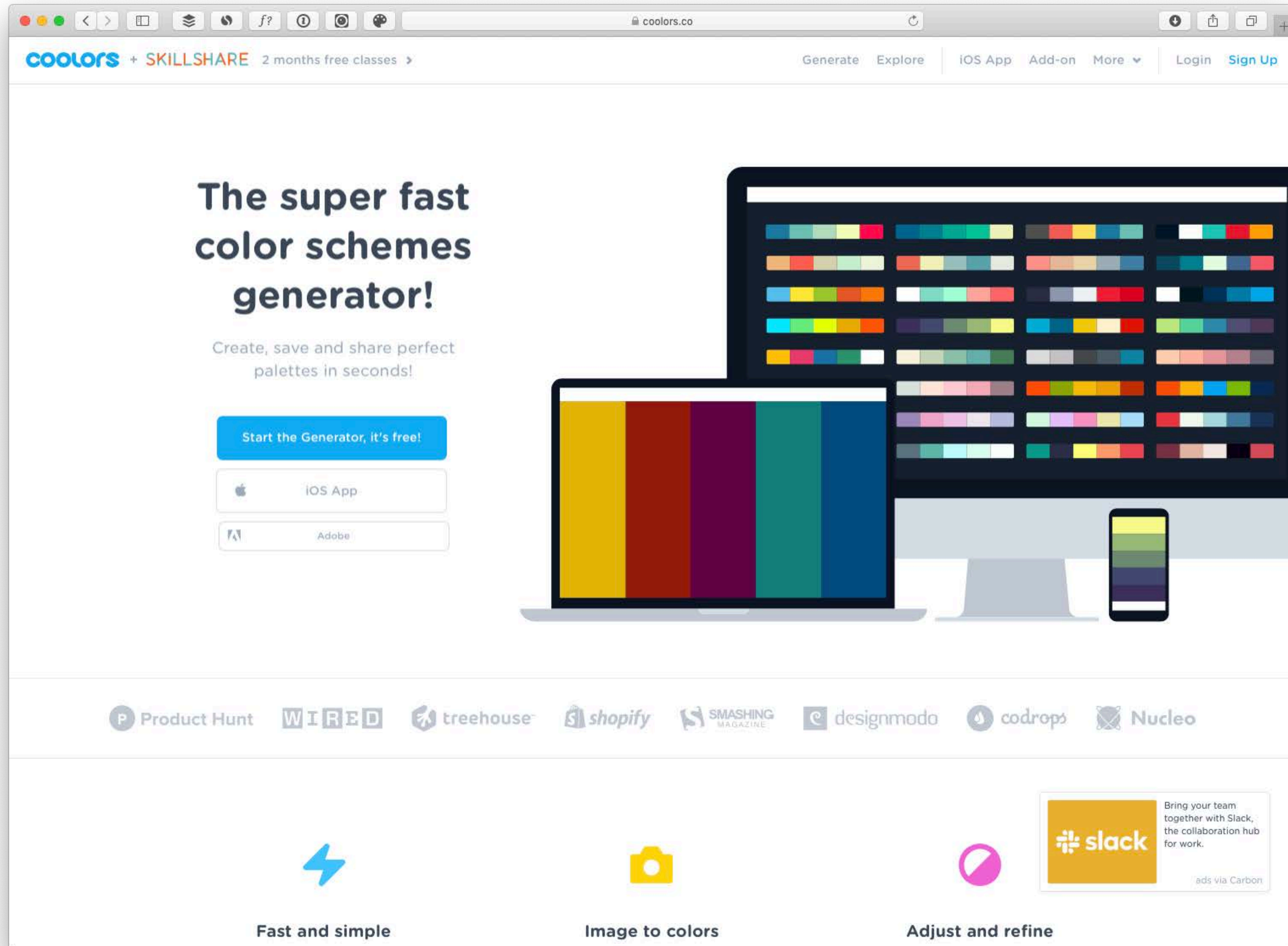
// ColorSnapper2
var color3 = NSColor(red:0.863, green:0.078, blue:0.235, alpha:1)
var color4 = NSColor(red:0.863, green:0.078, blue:0.235, alpha:1)
color3 == color4

```

● r 0,863 g 0,078 b 0,235 a 1,0
● r 0,855 g 0,102 b 0,251 a 1,0
false
Swift NSColor RGB
0.863 0.078 0.235 ,235 a 1,0
● r 0,863 g 0,078 b 0,235 a 1,0
true

Start typing to filter formats...

- Generic Hex
0x3f974f
- Generic 8-bit
63, 151, 79
- Generic Decimal
0.247, 0.592, 0.310
- CSS Hex
#3f974f
- CSS RGB
rgb(63, 151, 79)
- CSS RGBA
rgba(63, 151, 79, 1)
- CSS HSL
hsl(131, 41%, 42%)
- CSS HSLA
hsla(131, 41%, 42%, 1)
- Swift NSColor RGB
NSColor(red:0.247, green:0.592, blue:0.310, alpha:1)
- Swift NSColor device RGB
NSColor(deviceRed:0.247, green:0.592, blue:0.310, alpha:1)



The screenshot shows the homepage of colors.co. At the top, there's a navigation bar with the site name 'colors.co', a partnership with 'SKILLSHARE' (offering 2 months free classes), and links for 'Generate', 'Explore', 'iOS App', 'Add-on', 'More', 'Login', and 'Sign Up'. The main headline reads 'The super fast color schemes generator!' followed by the subtext 'Create, save and share perfect palettes in seconds!'. A prominent blue button says 'Start the Generator, it's free!'. Below this are buttons for 'iOS App' and 'Adobe'. To the right, a large graphic depicts a laptop, a desktop monitor, and a smartphone, all displaying various color palettes. A row of logos for partner sites like Product Hunt, WIRED, treehouse, shopify, SMASHING MAGAZINE, designmodo, codrops, and Nucleo is visible. At the bottom, three feature highlights are shown: 'Fast and simple' with a lightning bolt icon, 'Image to colors' with a camera icon, and 'Adjust and refine' with a circular adjustment icon. A Slack advertisement is also present in the bottom right corner.

Colordot

color.hailpixel.com

Colordot for iOS

Download on the App Store

A color picker for humans.

Colordot for iOS is an easy way to create and share color palettes with just a swipe of your finger.

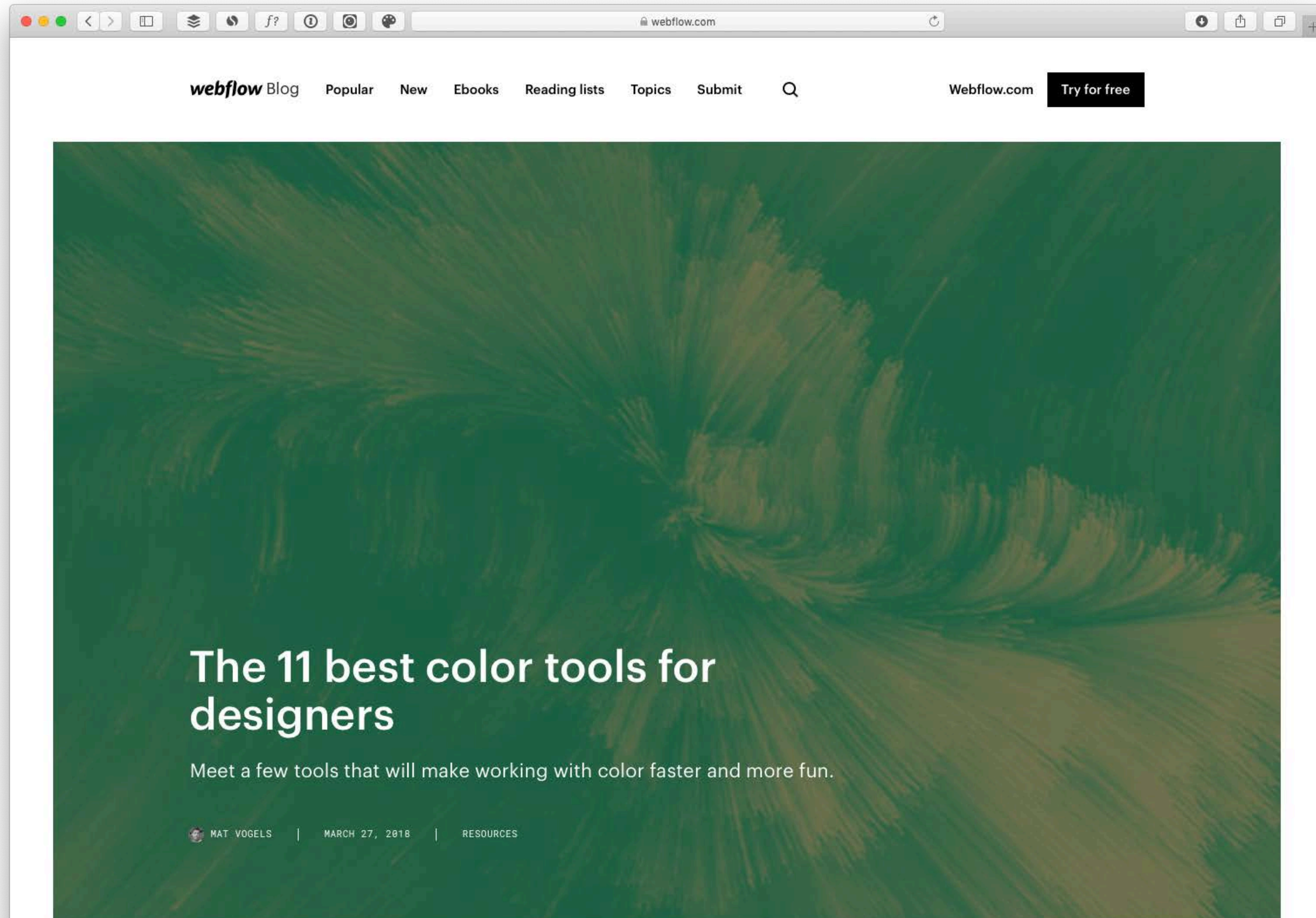
[Available on the App Store →](#)

So, what can it do?





For more inspirational tools, check out this Blog article



Good luck!

Edo van Dijk
@edoch



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