

Munsell Maker User Guide

D. Bur, September 2007

This script is intended to help users to quickly create materials (colors) in SketchUp, based on the Munsell color system of representation.

Since this system contains more than 5000 different colors, it is not handy to have them all stored in a huge SketchUp material library, so it is better to create only several colors on the fly, when you need them.

Provided options give you the opportunity to:

- create a single color
- generate a named "family" of colors
- create a set of colors based on hue, value, chroma, or any combination of these parameters.

1. Installation

Unzip the archive in your Plugins folder. Quite simple...

You should have three files there: Munsell.rb, Munsell_tables.txt, Munsell_hexa.txt

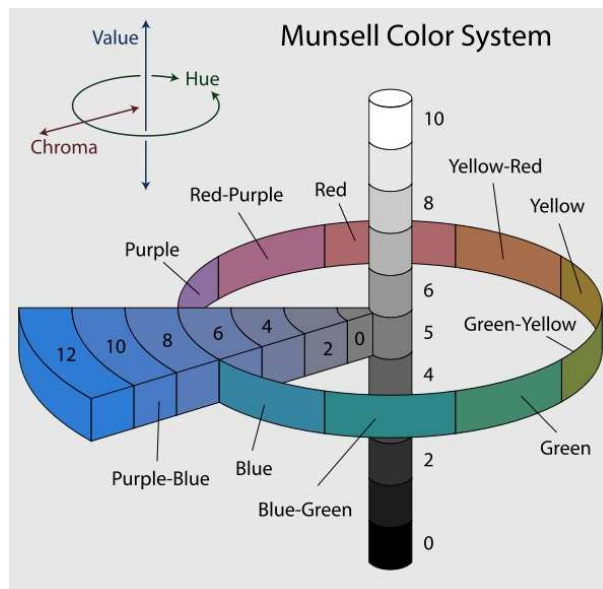
Munsell.rb is the script itself, the two text files are the colors, stored in hexadecimal and rgb mode. Please don't edit these files unless you know what you are doing ;)

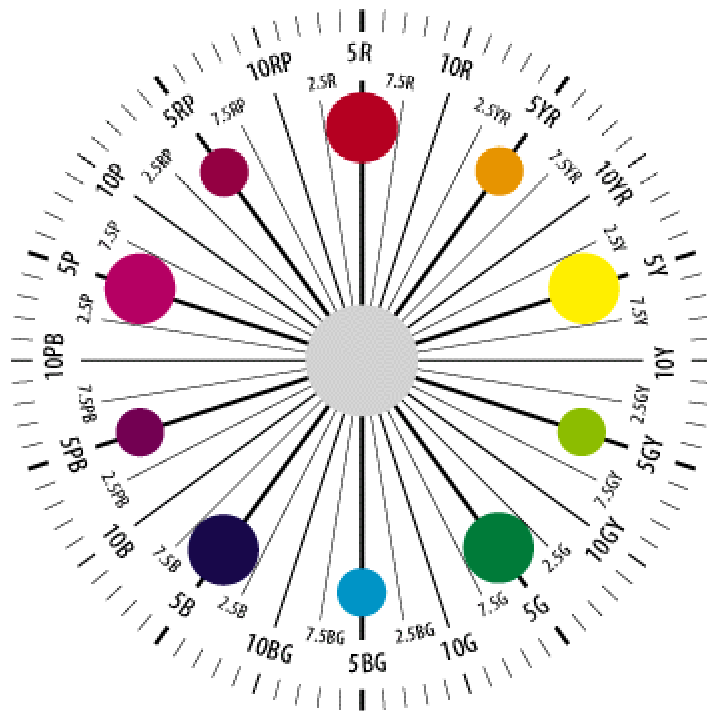
2. The Munsell color system

[From Wikipedia]

In [colorimetry](#), the **Munsell color system** is a [color space](#) that specifies [colors](#) based on three color dimensions, [hue](#), value (or [lightness](#)), and chroma (roughly [saturation](#)). It was created by Professor [Albert H. Munsell](#) in the first decade of the 20th century.

Several earlier color order systems had placed colors into a three dimensional [color solid](#) of one form or another, but Munsell was the first to separate hue, value, and chroma into perceptually uniform and independent dimensions, and was the first to systematically illustrate the colors in three dimensional space.^[1] Munsell's system, and particularly the later rennotations, is based on rigorous measurements of human subjects' visual responses to color, putting it on a firm experimental scientific basis. Because of this basis in human visual perception, Munsell's system has outlasted its contemporary color models, and though it has been superseded for some uses by models such as [CIE L*a*b*](#) and [CIECAM02](#), it is still in wide use today.





Naming convention:

HUE:

Hue (H) is the actual “color” that follows a natural order of red (R), yellow (Y), green (G), blue (B) and purple (P); designated principle hues. Between each were intermediate hues yellow-red (YR), green-yellow (GY), bluegreen (BG), purple-blue (PB) and red-purple (RP). Arranged in an equally divided circle, these colors form the Munsell Hue Circle.

As you can see on the above Munsell circle, each hue is designated by a code:

	Red	R		Blue-Green	BG
	Yellow-Red	YR		Blue	B
	Yellow	Y		Purple-Blue	PB
	Green-Yellow	GY		Purple	P
	Green	G		Red-Purple	RP

VALUE:

Value (V) indicates the lightness of a color. The scale of value ranges from 0 for pure black to 10 for pure white.

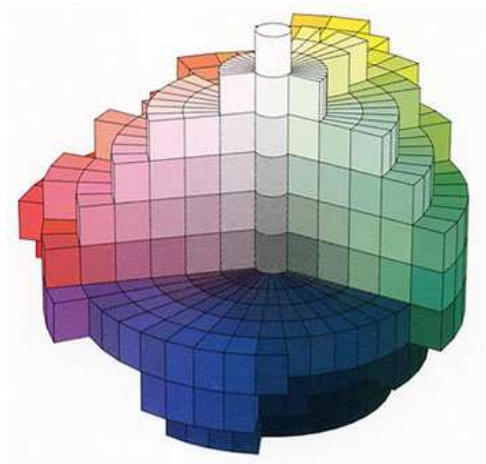
Black, white and the grays between them are called “neutral colors.” They have no hue. Colors that have a hue are called “chromatic colors.” The value scale applies to chromatic as well as neutral colors.

CHROMA:

Chroma (C) is the degree of departure of a color from the neutral color of the same value. Colors of low chroma are sometimes called “weak,” while those of high chroma are said to be “highly saturated,” “strong” or “vivid.” The chroma scale starts at zero, for neutral colors, but there is no arbitrary end to the scale. As new pigments have become available, Munsell color chips of higher chroma have been made for many hues and values. The chroma scale for normal reflecting materials extends beyond 20 in some cases. Fluorescent materials may have chromas as high as 30.

Munsell color solid:

All colors lie within a specific region of Munsell color space called the "Munsell color solid." Hue is limited to one turn around the circle. The scale of value is limited on the lower end by pure black, which is as dark as a color can be, and on the top by pure white, which is as light as a color can be. For a given value, there is a limit to the chroma that is possible, even with theoretically ideal coloring agents. Real coloring agents, with less than ideal characteristics, impose further limitations on physical representations of the color solid. The Munsell Color Order System itself is applicable to all possible colors. The highest chroma yellow colors have rather high values, while the highest chroma blue colors have lower values.



The syntax of the name of a particular color in the below Munsell solid is:

HUE VALUE/CHROMA

All colors are arranged three-dimensionally according to hue, value and chroma creating the Munsell Color Space. Each color has a specific Munsell color notation from which you can easily visualize the color. Using the Munsell nomenclature HV/C, our vivid red example would have the Munsell notation 5R 6/14. 5R is the hue (red), 6 is the value (moderately light), and a 14 chroma indicates a highly chromatic color.

When a finer division is needed for any of the attributes, decimals are used. For example, 5.3R 6.1/14.4. When the hues of the primary hue circle are used, the notation is written in the same way, for example 2B' 5/4. The notation for a neutral color is written: NV/. The chroma of a neutral color is zero, but it is customary to omit the zero in the notation. The notation N 1/ denotes a black, a very dark neutral, while N 9/ denotes a white, a very light neutral. This notation for a middle gray is N 5/.

Data sources:

Munsell colors conversion to the RGB system generates some small differences, but the most accurate data has been found here:

<http://www.cis.rit.edu/>

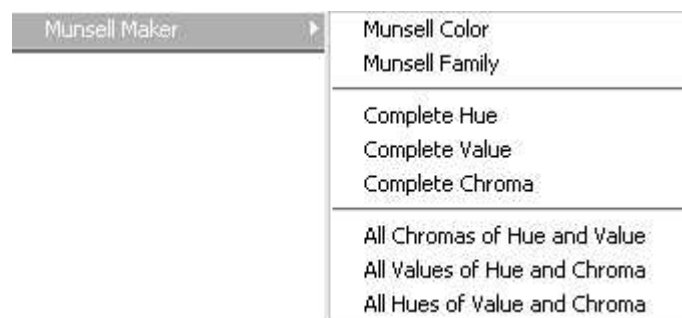
and here:

<http://www.anthus.com/Colors/Cent.html>

3. Usage

After you have installed the 3 files in your Plugins folder, re-start SketchUp.

Under the Plugins menu, you should have a sub-menu "Munsell Maker" with the following options:

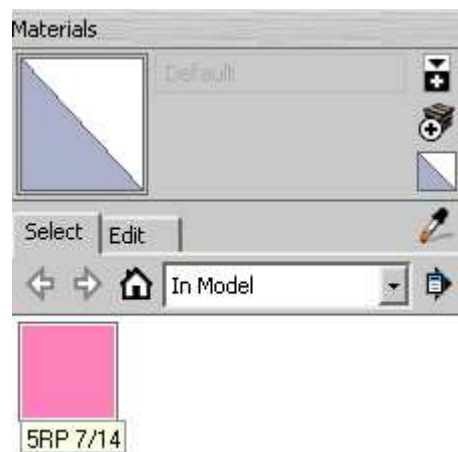


3.1. Munsell color:

This option will create a single color, using the Munsell naming convention. Select hue, value and chroma in the dialog box:

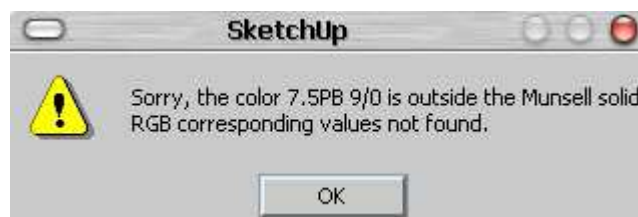


In this example, a material is created in the "In model" library like this:



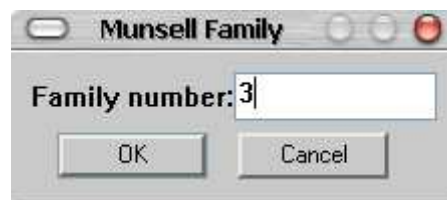
Note that the name of the material follows the Munsell syntax.

When requesting a color which is outside the Munsell solid, the following message is displayed and no material is created:

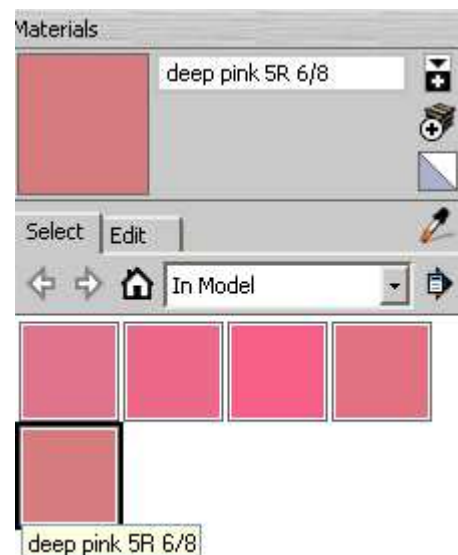


3.2 Munsell family:

Munsell colors have been classified in 262 "families" of hues that have more understandable names. A family gathers colors which may be used as a gradient or together as a set of harmonious colors. This option first displays all the names of the families, each of them with a number. Check for the number of the family you want to create, and enter it in the second dialog box.



In this example, the family "deep pink" is selected. It contains 5 colors, these are created in the "In Model" library, and their names are built with the family name and the Munsell name:

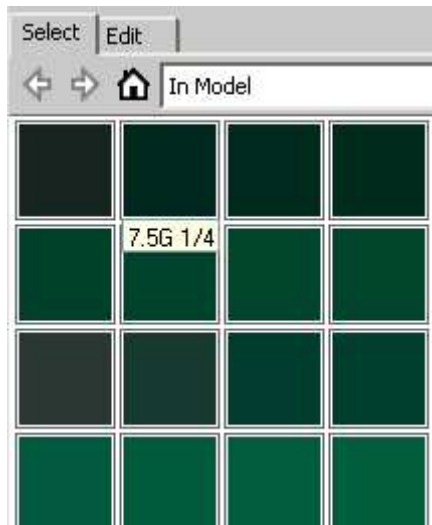


3.3. Complete hue

With this option, all colors in the Munsell solid are created for the selected hue, regardless of value and chroma. Select hue in the dialog box:

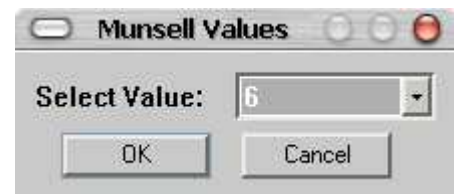


A bunch of materials are created, like in the following partial image, all colors have a name beginning with the selected hue (7.5G in this example):

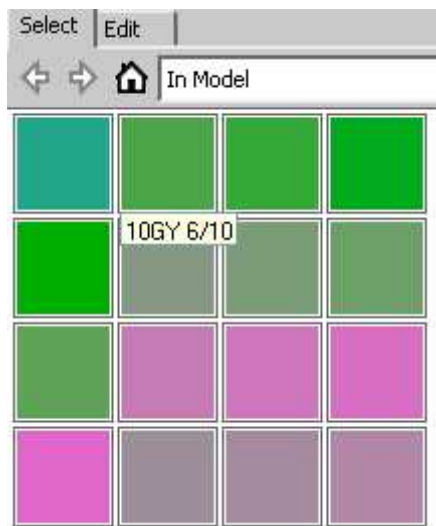


3.4. Complete value

With this option, all colors in the Munsell solid are created for the selected value, regardless of hue and chroma. Select value in the dialog box:



A bunch of materials are created, like in the following partial image, all with the same value in their names (6 in this example):

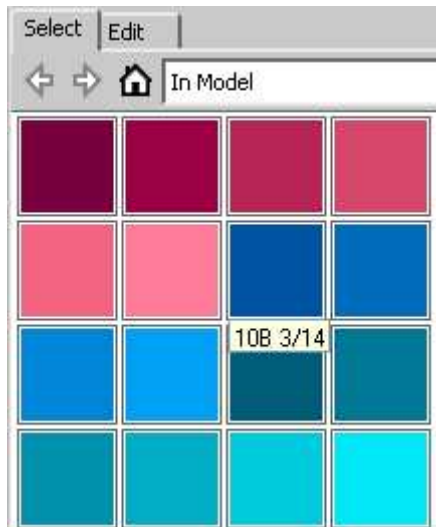


3.5. Complete chroma

With this option, all colors in the Munsell solid are created for the selected chroma, regardless of hue and value. Select chroma in the dialog box:

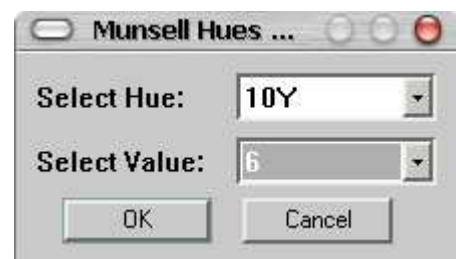


A bunch of materials are created, like in the following partial image, all with the same chroma in their names (14 in this example):

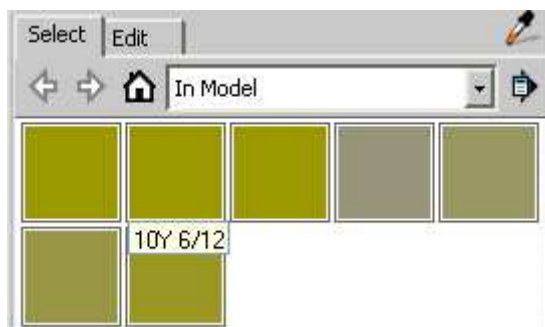


3.6. All Chromas of Hue and Value

With this option, all colors in the Munsell solid are created for the selected hue and value, regardless of chromas. Select hue and value in the dialog box:



Materials are created, like in the following partial image, all with the same hue and value in their names (10Y 6/... in this example):



3.7. All Values of Hue and Chroma

With this option, all colors in the Munsell solid are created for the selected hue and chroma, regardless of values. Select hue and chroma in the dialog box:

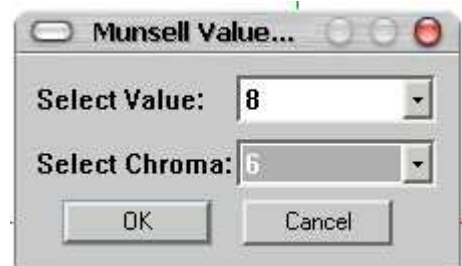


Materials are created, like in the following partial image, all with the same hue and value in their names (2.5P .../10 in this example):

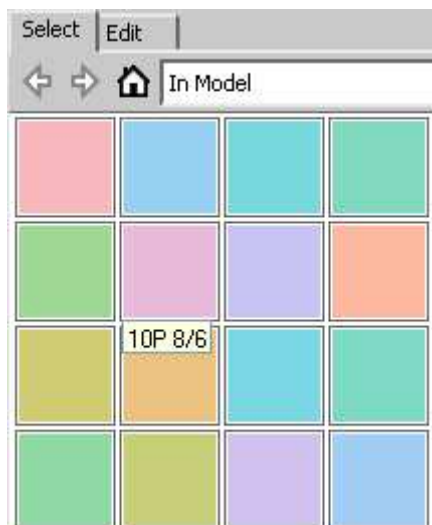


3.8. All Hues of Value and Chroma

With this option, all colors in the Munsell solid are created for the selected value and chroma, regardless of hues. Select hue and value in the dialog box:



Materials are created, like in the following partial image, all with the same hue and value in their names (... 8/6 in this example):



Munsell Maker is freeware.

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