MUNSELL®
SOIL COLOR
CHARTS

1994
REVISED
EDITION

MUNSELL® COLOR

Macbeth Division of Kollmorgen Instruments Corporation
405 Little Britain Road, New Windsor, NY 12553
Tel: (800) MACBETH, (914) 565-7660. Fax: (914) 561-0267

DETERMINATION OF SOIL COLOR

quoted in part from
U.S. Dept. Agriculture Handbook 18–Soil Survey Manual

Soil colors are most conveniently measured by comparison with a color chart. The collection of charts generally used with soils is a modified version of the collection appearing in the Munsell Book of Color and includes only that portion needed for soils, about one-fifth of the entire range found in the complete edition.

The nine charts in the Soil Collection display 322 different standard color chips systematically arranged according to their Munsell notations, on cards carried in a loose leaf notebook. The arrangement is by the three dimensions that combine to describe all colors and are known in the Munsell system as Hue, Value and Chroma.

The Hue notation of a color indicates its relation to Red, Yellow, Green, Blue, and Purple; the Value notation indicates its lightness; and the Chroma notation indicates its strength (or departure from a neutral of the same lightness).

The colors displayed on the individual Soil Color Charts are of constant Hue, designated by a symbol in the upper right hand-corner of the card. Vertically, the colors become successively lighter from the bottom of the card to the top in visually equal steps; their value increases. Horizontally they increase in Chroma from left to right. The Value notation of each chip is indicated by the vertical scale in the far left column of the chart. The Chroma notation is indicated by the horizontal scale across the bottom of the chart.

"The nomenclature for soil color consists of two complementary systems: (1) Color names; and (2) the Munsell notation of color. Neither of these alone is adequate for all purposes. The color names are employed in all descriptions for publication and for general use.

The Munsell notation is used to supplement the color names wherever greater precision is needed, as a convenient abbreviation in field descriptions, for expression of the specific relations between colors, and for statistical treatment of color data. The Munsell notation is especially useful for international correlation, since no translation of color names is needed. The names for soil colors are common terms now so defined as to obtain uniformity and yet accord, as nearly as possible, with past usage by soil scientists. Names like 'rusty brown,' 'mouse gray,' 'lemon yellow,' and 'chocolate brown' should never be used."

The soil color names and their limits are given in the diagrams which appear opposite each chart.

"The Munsell notation for color consists of separate notations for hue, value, and chroma, which are combined in that order to form the color designation. The symbol for hue is the letter abbreviation of the color of the rainbow (R for red, YR for Yellow-Red, Y for yellow) preceded by numbers from 0 to 10. Within each letter range, the hue becomes more yellow and less red as the numbers increase. The middle of the letter range is at 5; the zero point coincides with the 10 point of the next redder hue. Thus 5YR is in the middle of the yellow-red hue, which extends from 10R (zero YR) to 10YR (zero Y)."

"The notation for value consists of numbers from 0, for absolute black, to 10, for absolute white. Thus a color of value 5/ is visually midway between absolute white and absolute black. One of value 6/ is slightly less dark, 60 percent of the way from black to white, and midway between values of 5/ and 7/."

"The notation for chroma consists of numbers beginning at 0 for neutral grays, and increasing at equal intervals to a maximum of about 20, which is never really approached in soil. For absolute achromatic colors (pure grays, white, and black), which have zero chroma and no hue, the letter N (neutral) takes the place of a hue designation."

"In writing the Munsell notation, the order is hue, value, chroma with a space between the hue letter and the succeeding value number, and a diagonal between the two numbers for value and chroma. If expression beyond the whole numbers is desired, decimals are always used, never

fractions. Thus the notation for a color of hue 5YR, value 5, chroma 6, is 5YR 5/6, a yellowish-red. The notation for a color midway between the 5YR 5/6 and 5YR 6/6 chips is 5YR 5.5/6; for one midway between 2.5YR 5/6 and 5YR 6/8, it is at 3.75YR 5.5/7. The notation is decimal and capable of expressing any degree of refinement desired. Since color determinations cannot be made precisely in the field–generally no closer than half the interval between colors in the chart–expression of color should ordinarily be to the nearest color chip."

"In using the color charts, accurate comparison is obtained by holding the soil sample directly behind the apertures separating the closest matching color chips. Rarely will the color of the samples be perfectly matched by any color in the chart. The probability of having a perfect matching of the sample color is less than one in one hundred. It should be evident, however, which colors the sample lies between, and which is the closest match. The principal difficulties encountered in using the Soil Color Chart are (1) in selecting the appropriate hue card, (2) in determining colors that are intermediate between the hues in the chart and (3) in distinguishing between value and chroma where chromas are strong. In addition, the chart does not include some extreme dark, strong (low value, high chroma) colors occasionally encountered in moist soils. With experience, these extreme colors lying outside the range of the chart can be estimated."

The use of a mask will facilitate color matching, Two masks are included in the binder pocket: a black mask for use with dark samples and a gray mask for intermediate and light samples. The aperture in the mask allows exposure of four adjacent color chips; the remaining colors in the field are covered to eliminate the possibility of disturbing contrasts.

"While important details should be given, long involved designation of color should generally be avoided, especially with variegated or mottled colors. In these, only the extreme or dominant colors need be stated.Similarly, in giving the color names and Munsell notations for both the dry and moist colors, an abbreviated form, such as 'reddish brown' (5YR 4/4; 3/4 moist), simplifies the statement."

"By attempting detail beyond the allowable accuracy of field observations and sample selection, one may easily make poorer soil descriptions than by expressing the dominant colors simply. In all descriptions, terms other than the ones given on these charts should be used only in rare instances, and then only as supplemental expressions in parentheses where some different local usage is common."

"The ability to sense color differences varies among people even among those not regarded as color blind." The Farnsworth-Munsell 100 Hue Test, available from Munsell Color, is a dual-purpose test which examines subjects for color anomalies and at the same time grades color normals on their color aptitude.

The 1994 Revised Edition incorporates several changes from the previous editions as outlined below:

- The number of Gley colors have been more than doubled. As a result, there are now two Gley Charts. The first chart includes Neutrals, 10Y, 5GY, 10GY, 5G at /1 chroma and 5G at /2 chroma. The second chart includes 10G, 5BG, 10BG, 5B, 10B and 5PB at /1 chroma.
- 7/1 to 7/8 and 8/1 to 8/4 have been added to the 10R chart.
- 8/1 to 8/4 colors have been added to the 2.5YR chart.

The following supplementary charts are available:

- 7.5R, which is slightly more red than 10R, is used in most tropical and semi-tropical lands.
- 5R, which is slightly more red than 7.5R, is used in tropical lands, particularly Australia, Africa and Southeast Asia.

The 1994 Revised Edition of the Soil Color Charts can also be used for the evaluation of skin, hair and eye color in anthropology, criminology, pathology and forensic medicine. Anyone wishing to use the Soil Color Charts for these purposes will need to purchase the 7.5R and 5R supplementary charts.

GRANULAR AND CRUMB STRUCTURES

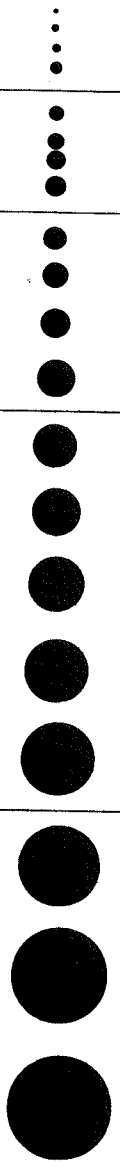
Very Fine
(less than 1 mm. diameter)

Fine
(1-2 mm. diameter)

Medium
(2-5 mm. diameter)

Coarse
(5-10 mm. diameter)

Very Coarse
(more than 10 mm. diameter)



PLATY STRUCTURES

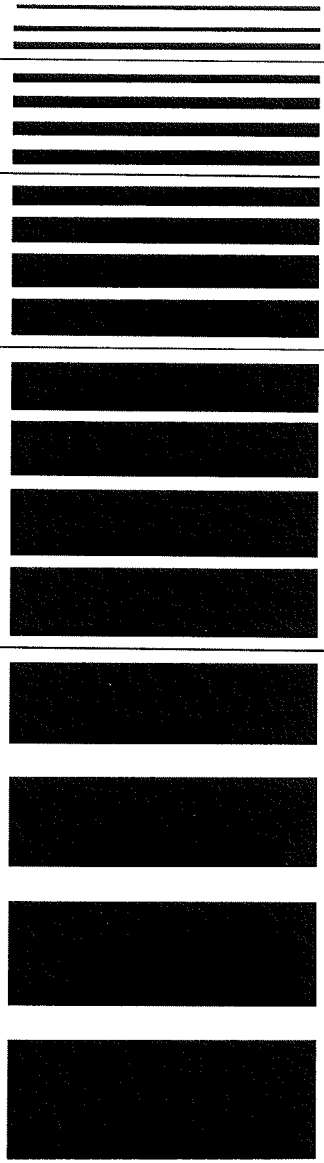
Very Fine
(less than 1 mm.)

Fine
(1-2 mm. thick)

Medium
(2-5 mm. thick)

Coarse
(5-10 mm. thick)

Very Coarse
(more than 10 mm. thick)



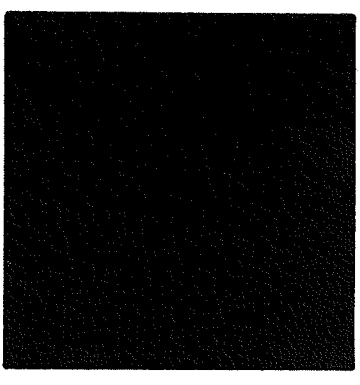
ANGULAR AND SUBANGULAR BLOCKY STRUCTURES

Very Fine
(less than 5 mm. diameter)

Fine
(5-10 mm. diameter)

Medium
(10-20 mm. diameter)

Coarse
(20-50 mm.
diameter)

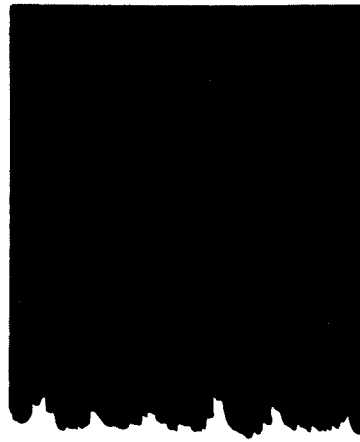


PRISMATIC AND COLUMNAR STRUCTURES

Very Fine
(less than 10 mm. diameter)

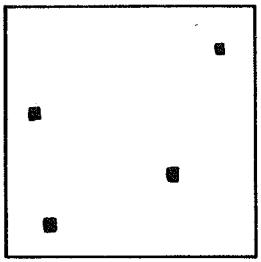
Fine
(10-20
mm.)

Medium
(20-50 mm.)

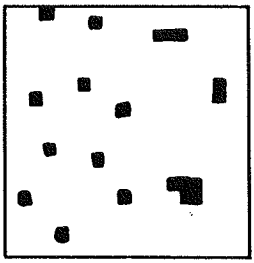


Coarse
(50-100 mm.)

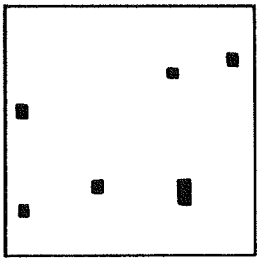
CHARTS FOR ESTIMATING PROPORTIONS OF MOTTLES AND COARSE FRAGMENTS



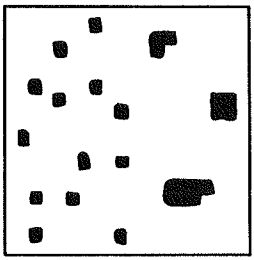
1%



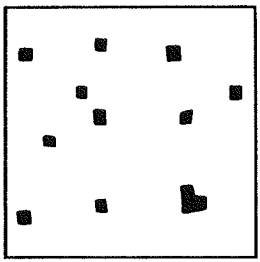
5%



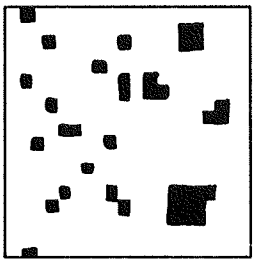
2%



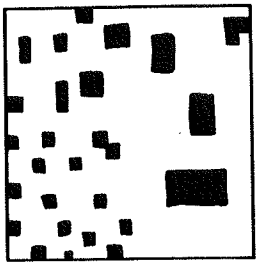
7%



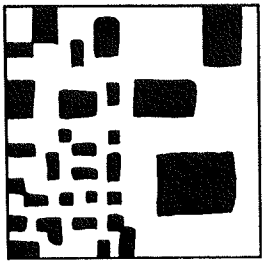
3%



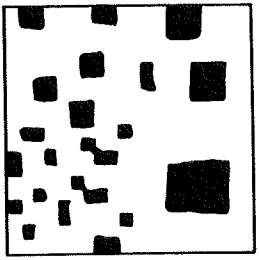
10%



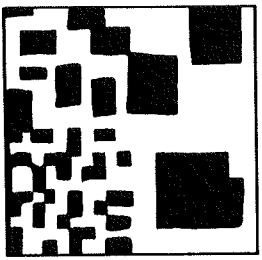
15%



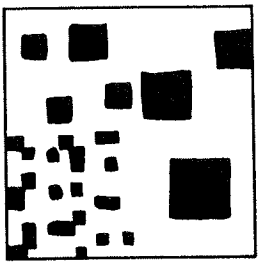
30%



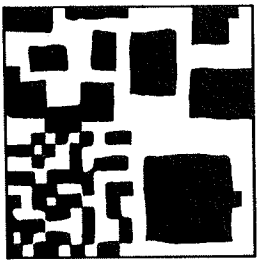
20%



40%



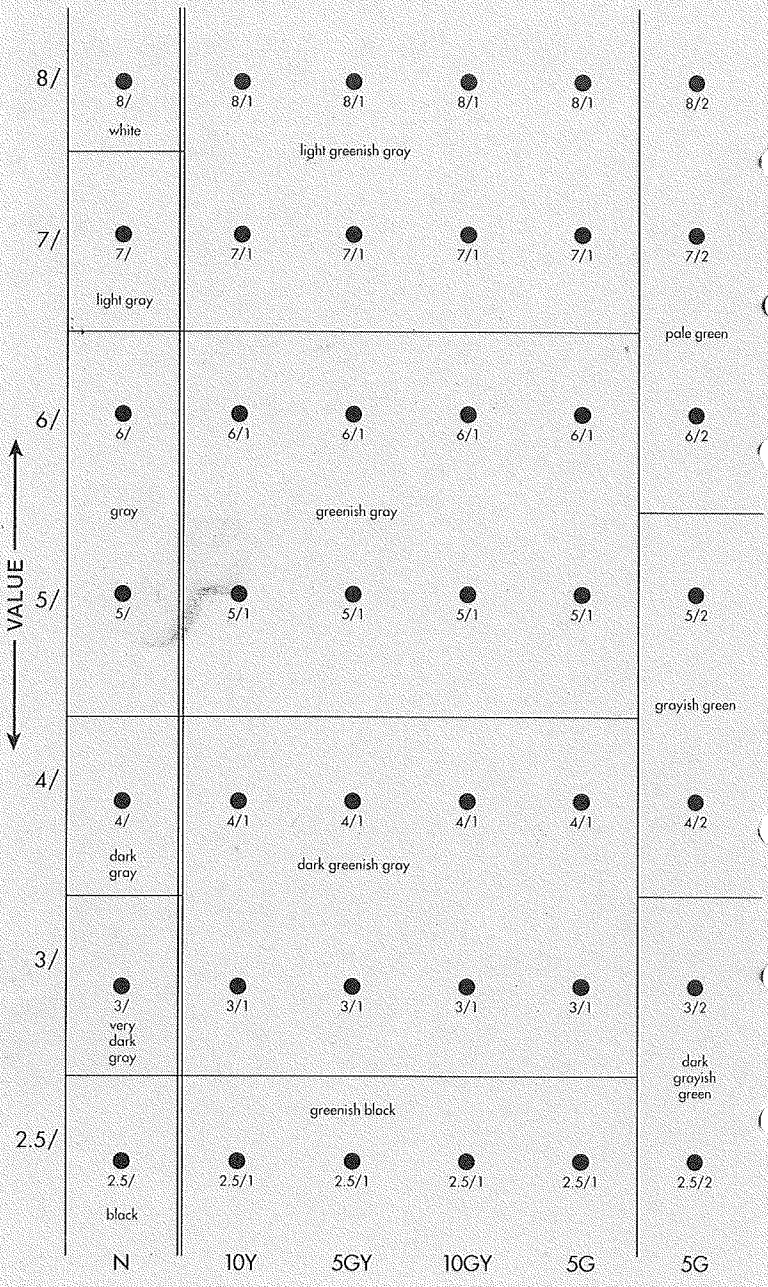
25%



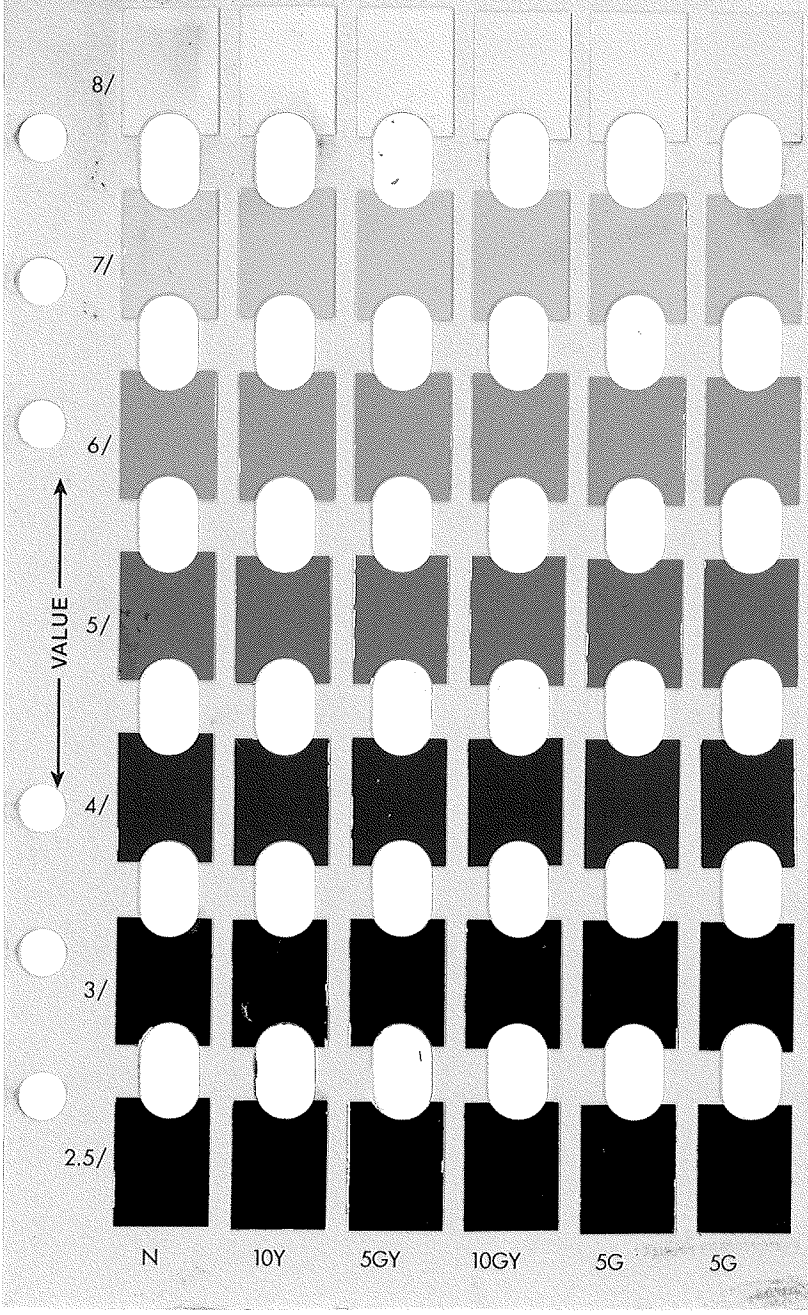
50%

Each fourth of any one square has the same amount of black

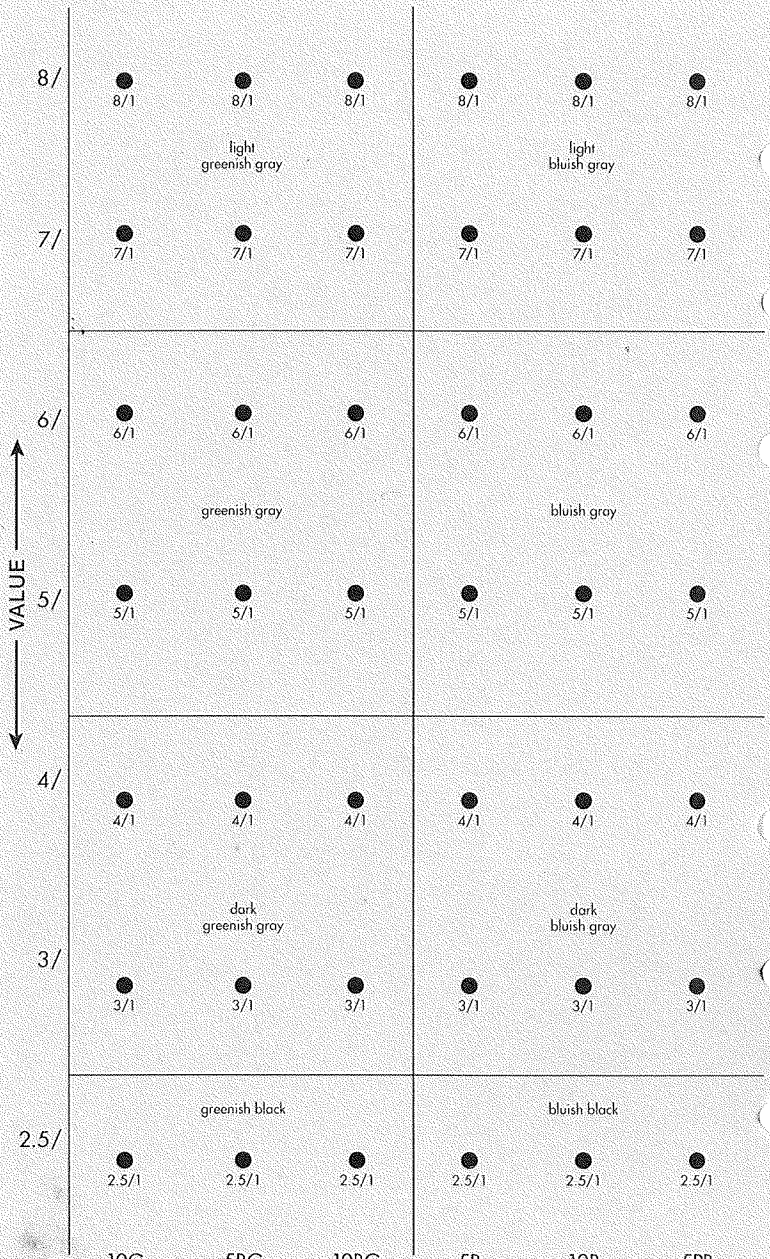
MUNSELL® COLOR NAME DIAGRAM 1 FOR GLEY



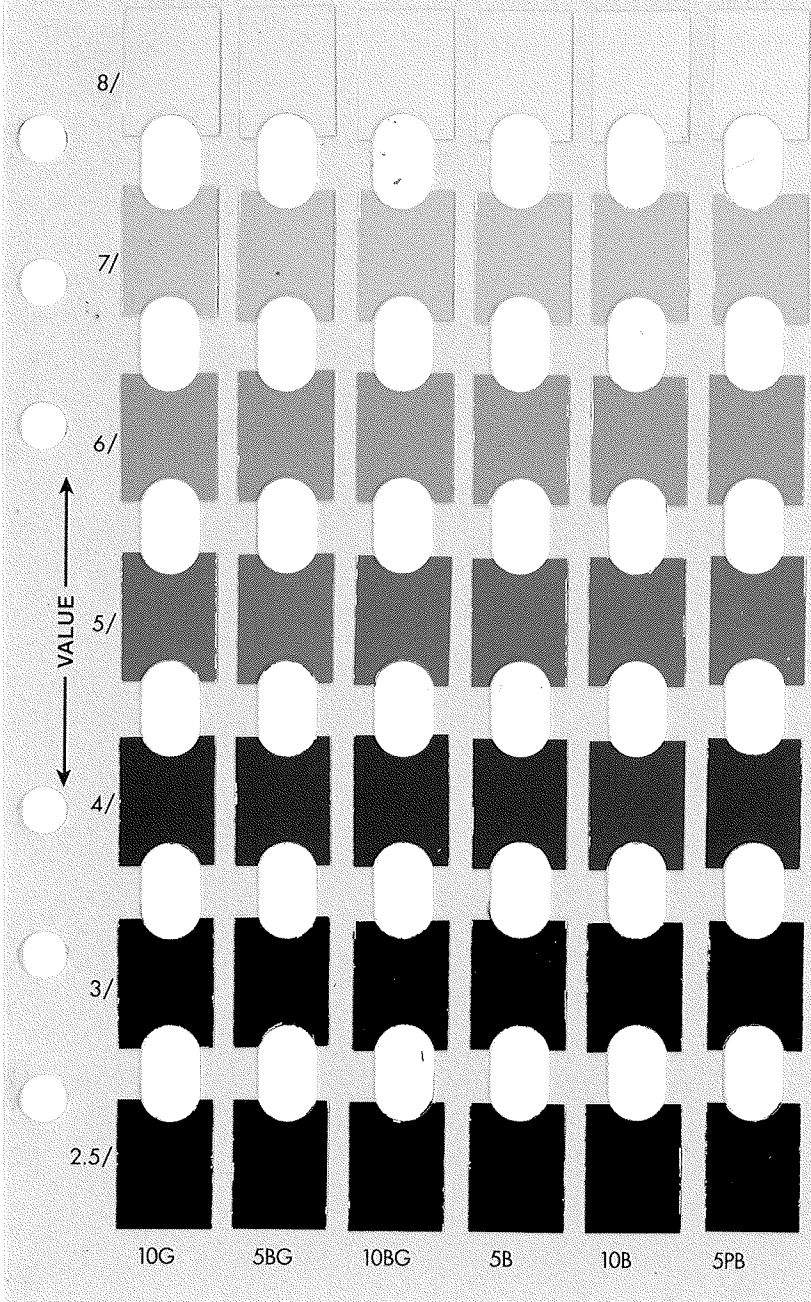
MUNSELL® COLOR CHART 1 FOR GLEY



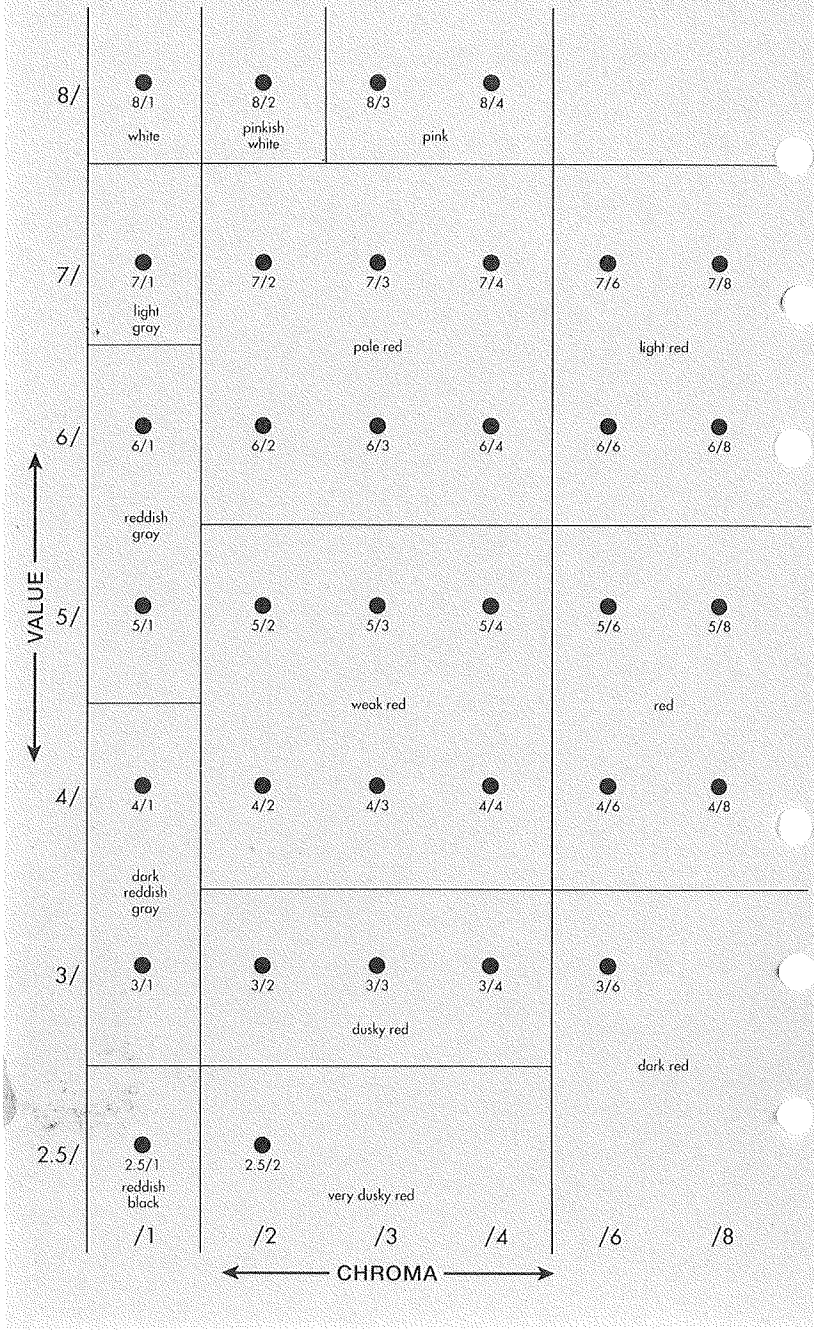
MUNSELL® COLOR NAME DIAGRAM 2 FOR GLEY



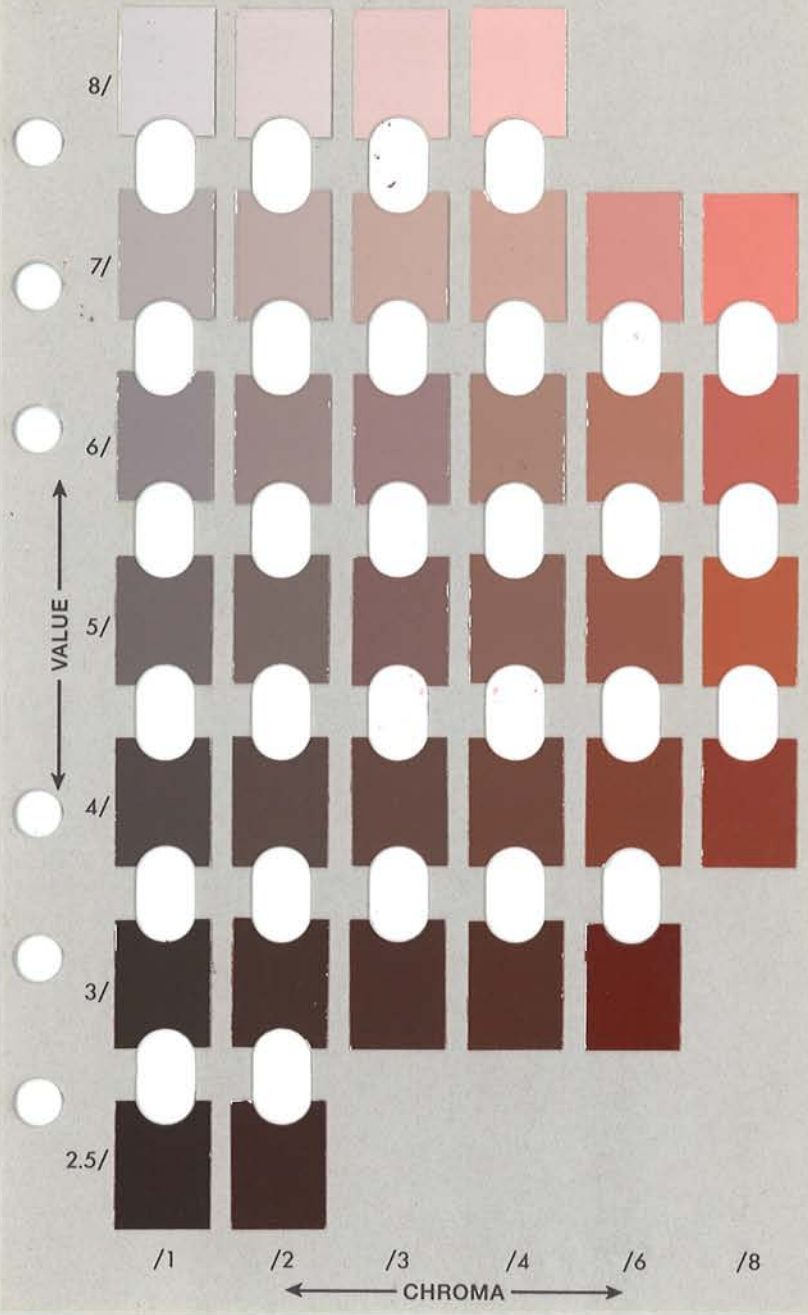
MUNSELL® COLOR CHART 2 FOR GLEY



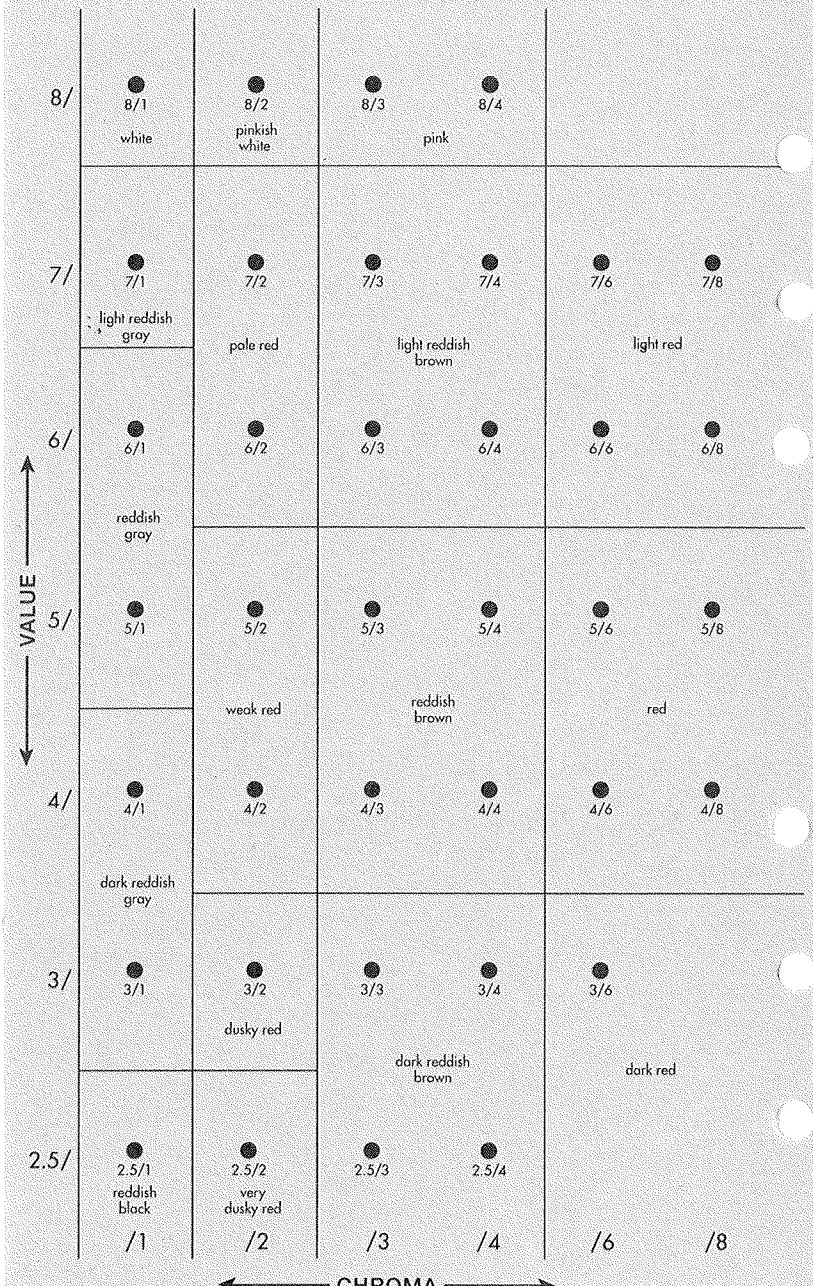
HUE 10R MUNSELL® SOIL COLOR NAME DIAGRAM

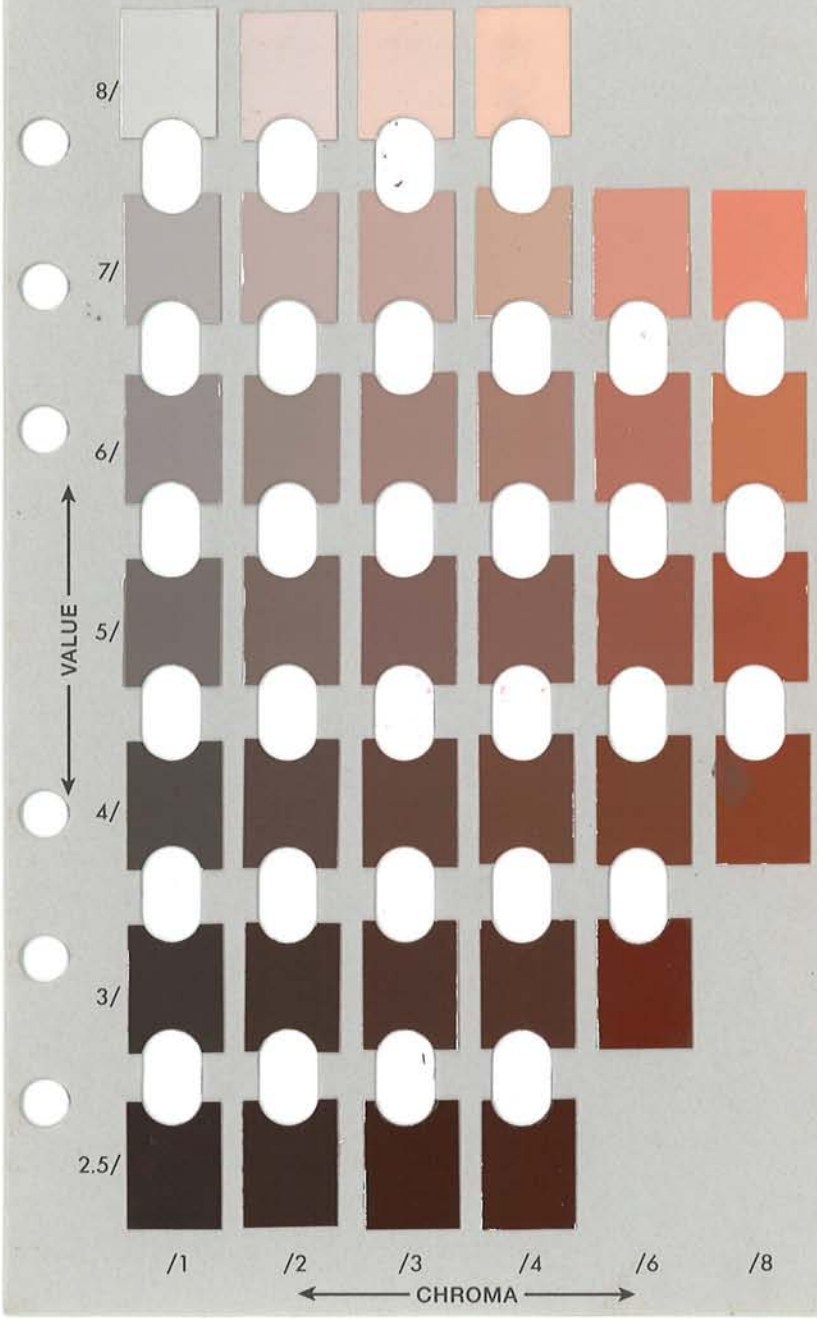


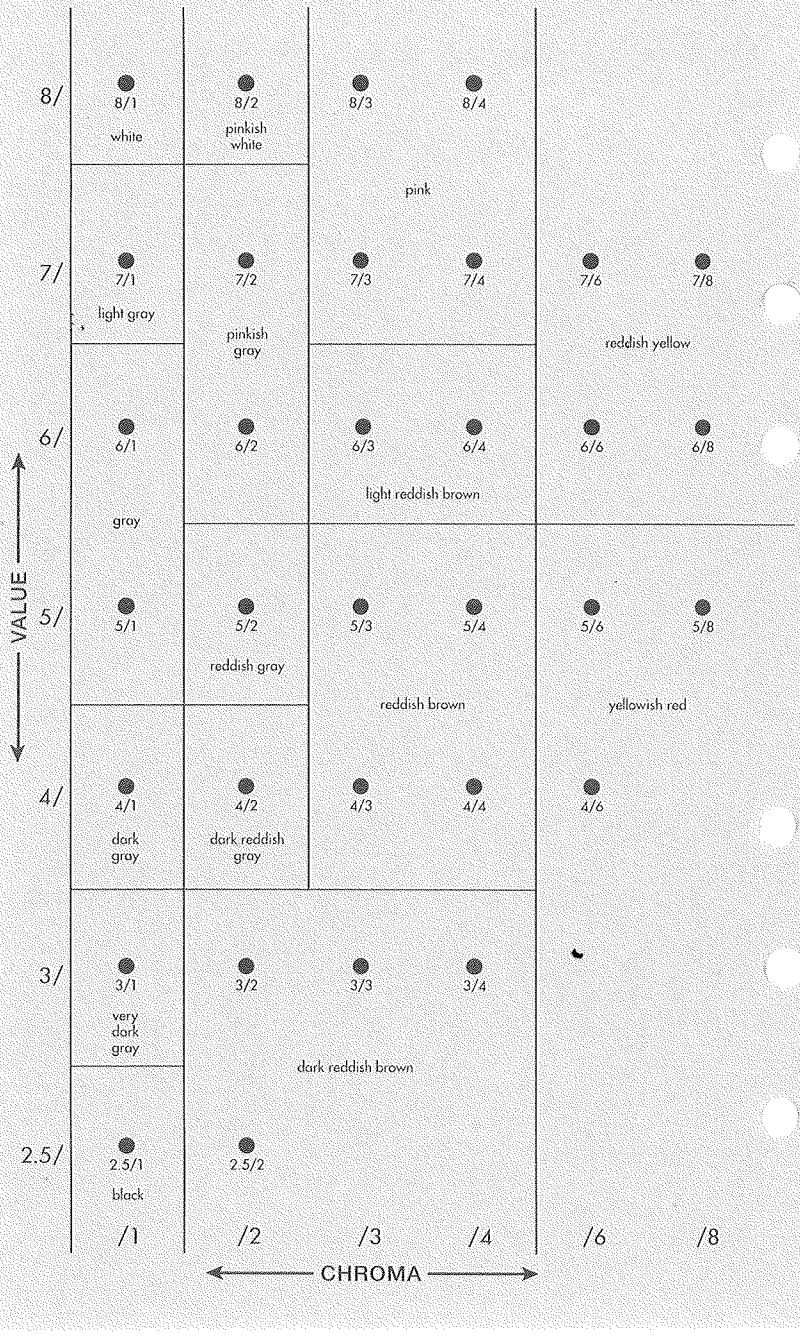
MUNSELL® SOIL COLOR CHART 10R



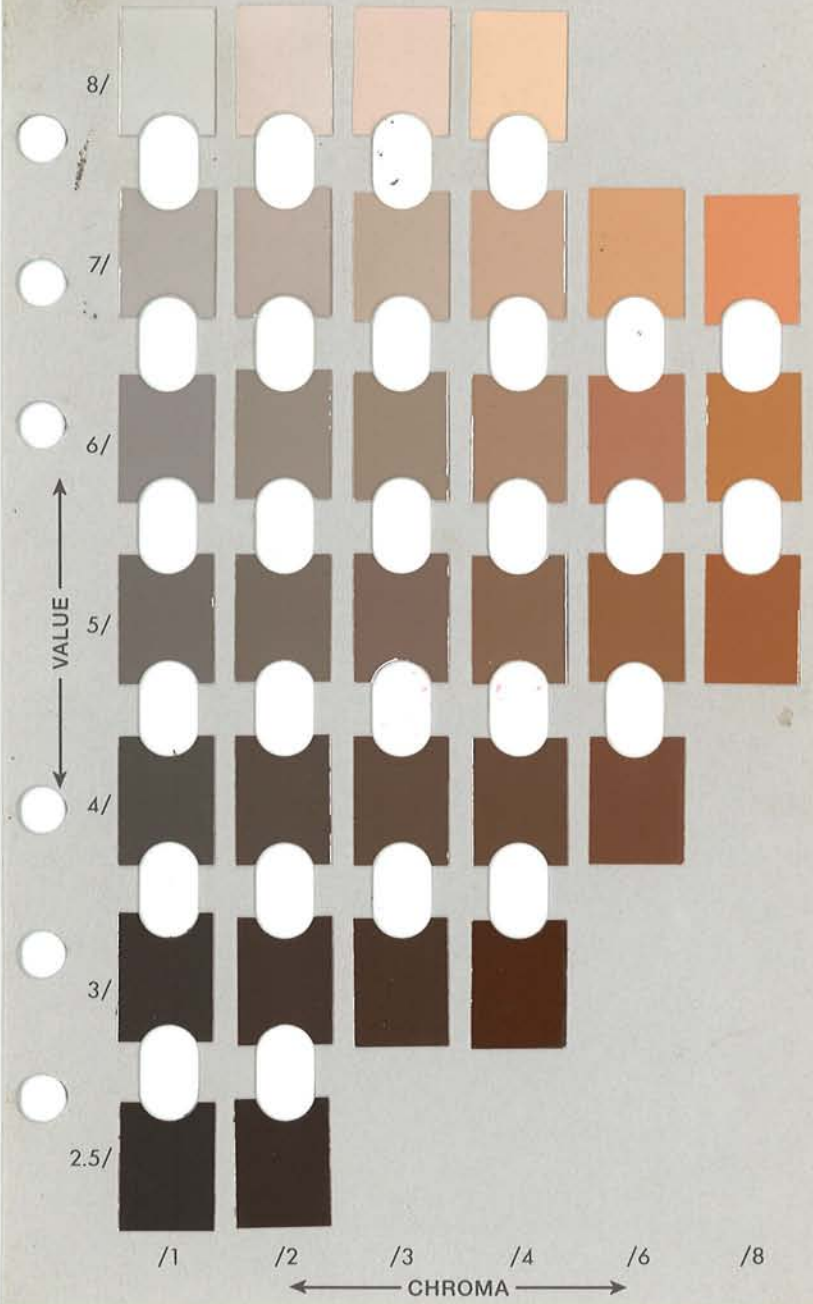
HUE 2.5YR MUNSELL® SOIL COLOR NAME DIAGRAM



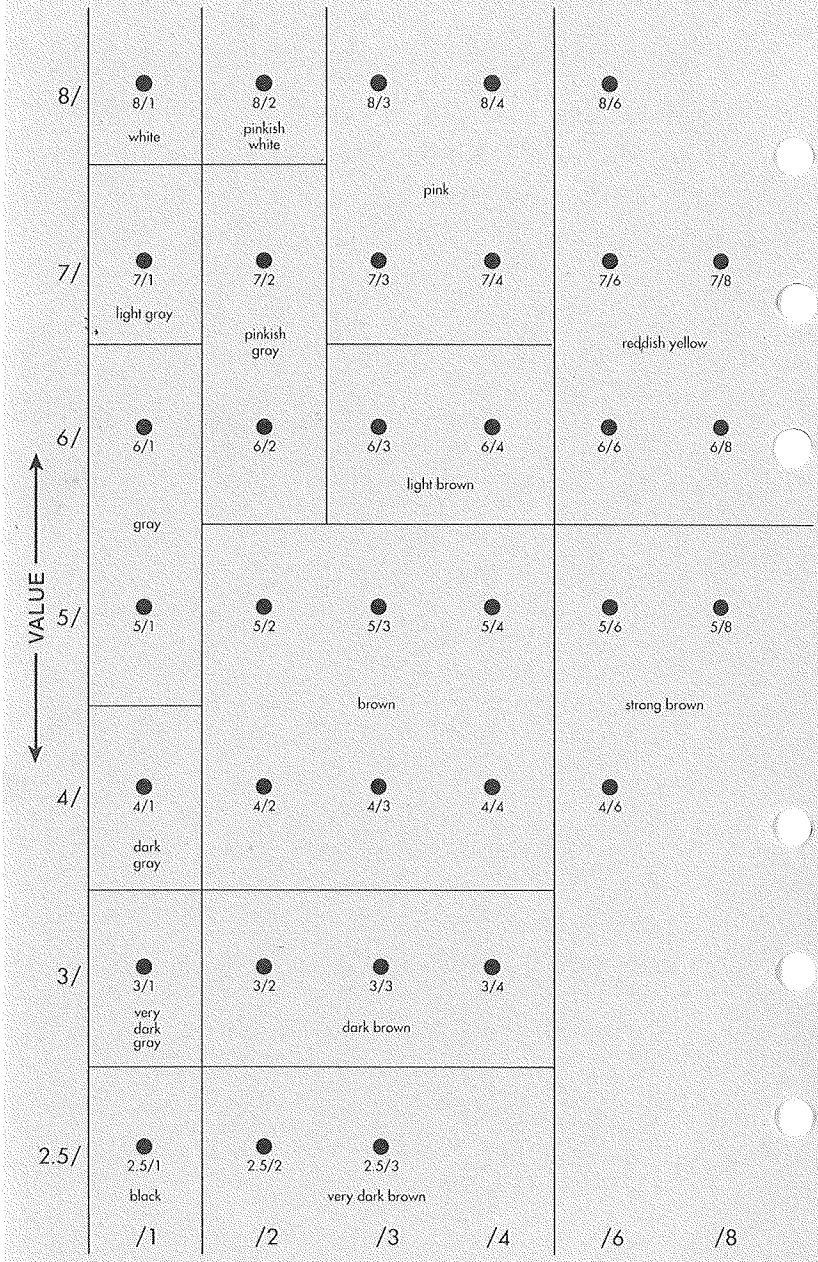

MUNSELL® SOIL COLOR CHART
2.5YR
8/
7/
6/
5/
4/
3/
2.5/
VALUE
/1
/2
/3
/4
/6
/8
CHROMA

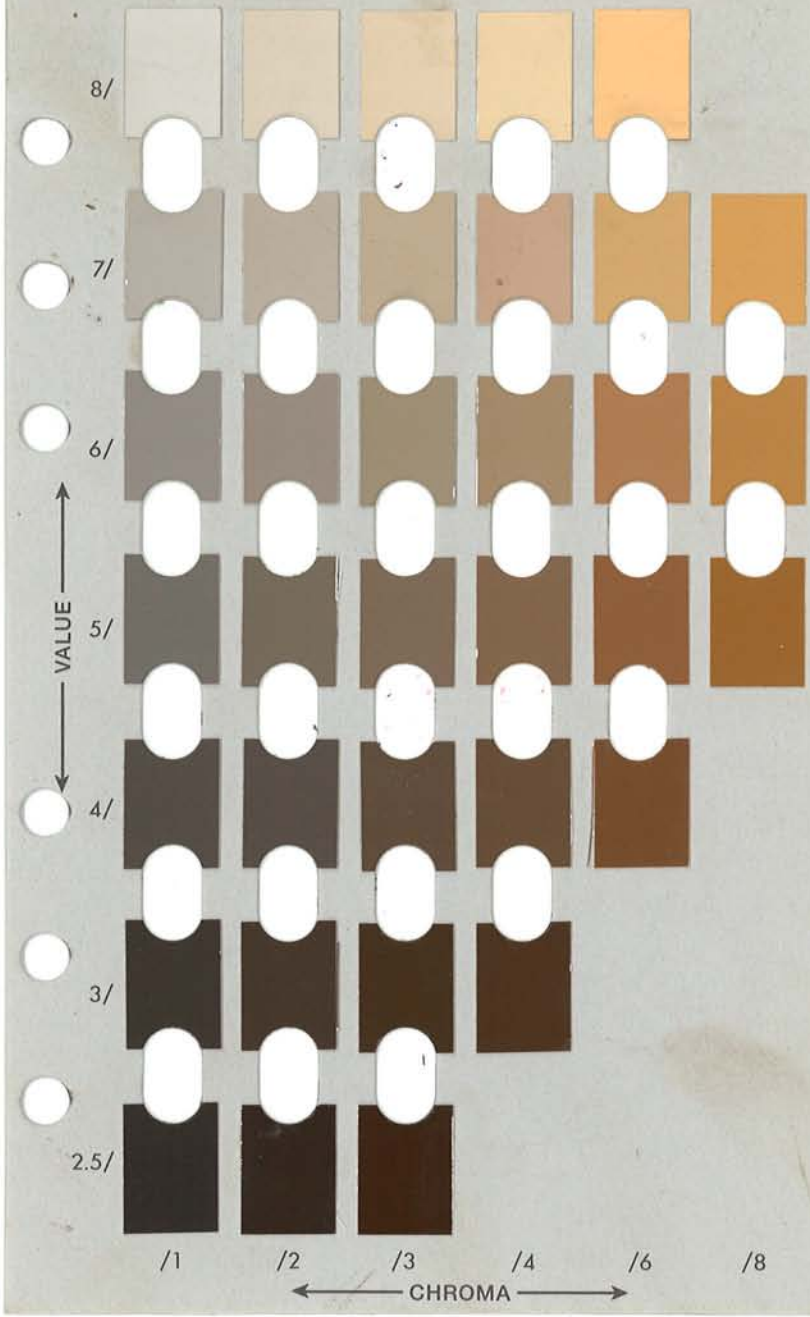

HUE 5YR
MUNSELL® SOIL COLOR NAME DIAGRAM
8/
7/
6/
5/
4/
3/
2.5/
VALUE
8/1
white
8/2
pinkish white
8/3
8/4
pink
7/1
light gray
7/2
pinkish gray
7/3
7/4
7/6
7/8
reddish yellow
6/1
gray
6/2
6/3
6/4
light reddish brown
6/6
6/8
5/1
5/2
reddish gray
5/3
5/4
reddish brown
5/6
5/8
yellowish red
4/1
dark gray
4/2
dark reddish gray
4/3
4/4
4/6
3/1
very dark gray
3/2
3/3
3/4
dark reddish brown
2.5/1
black
2.5/2
/1
/2
/3
/4
/6
/8
CHROMA

MUNSELL® SOIL COLOR CHART 5YR

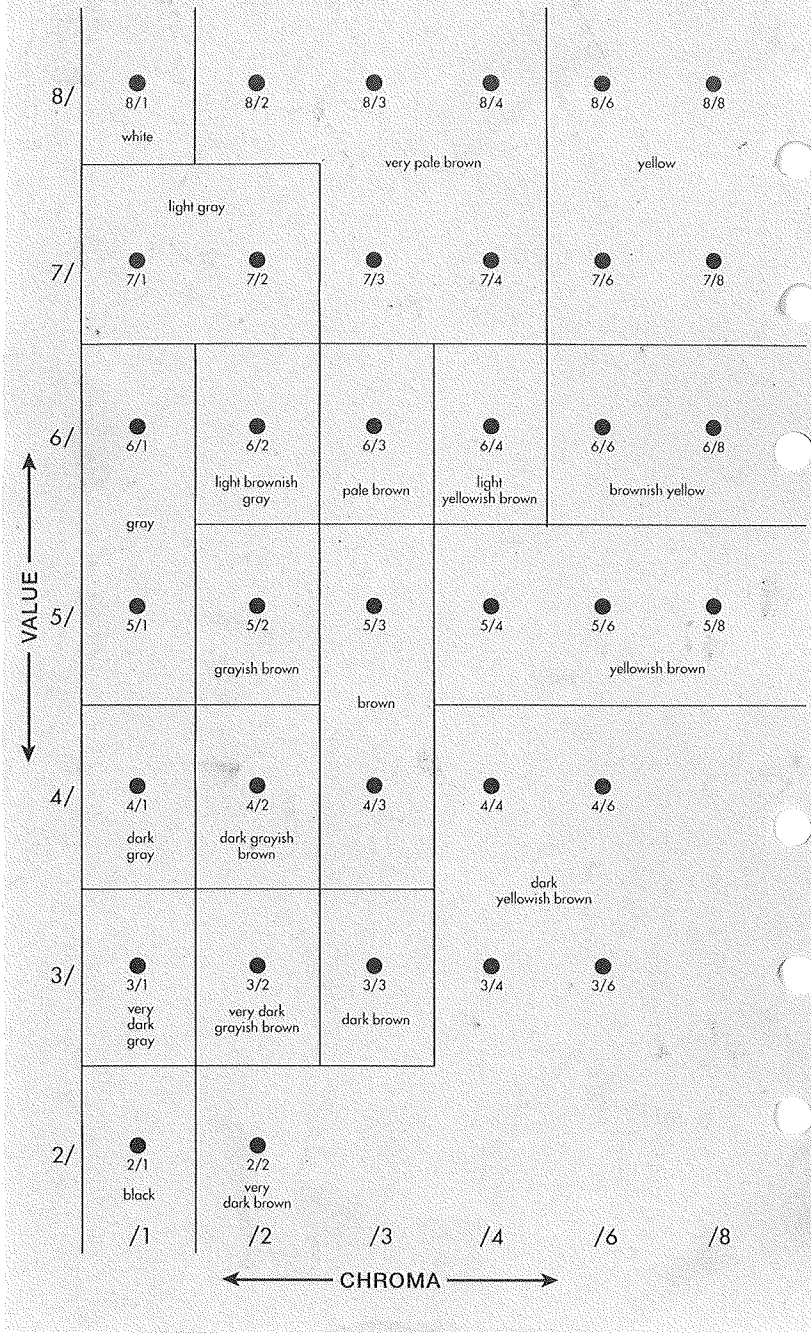


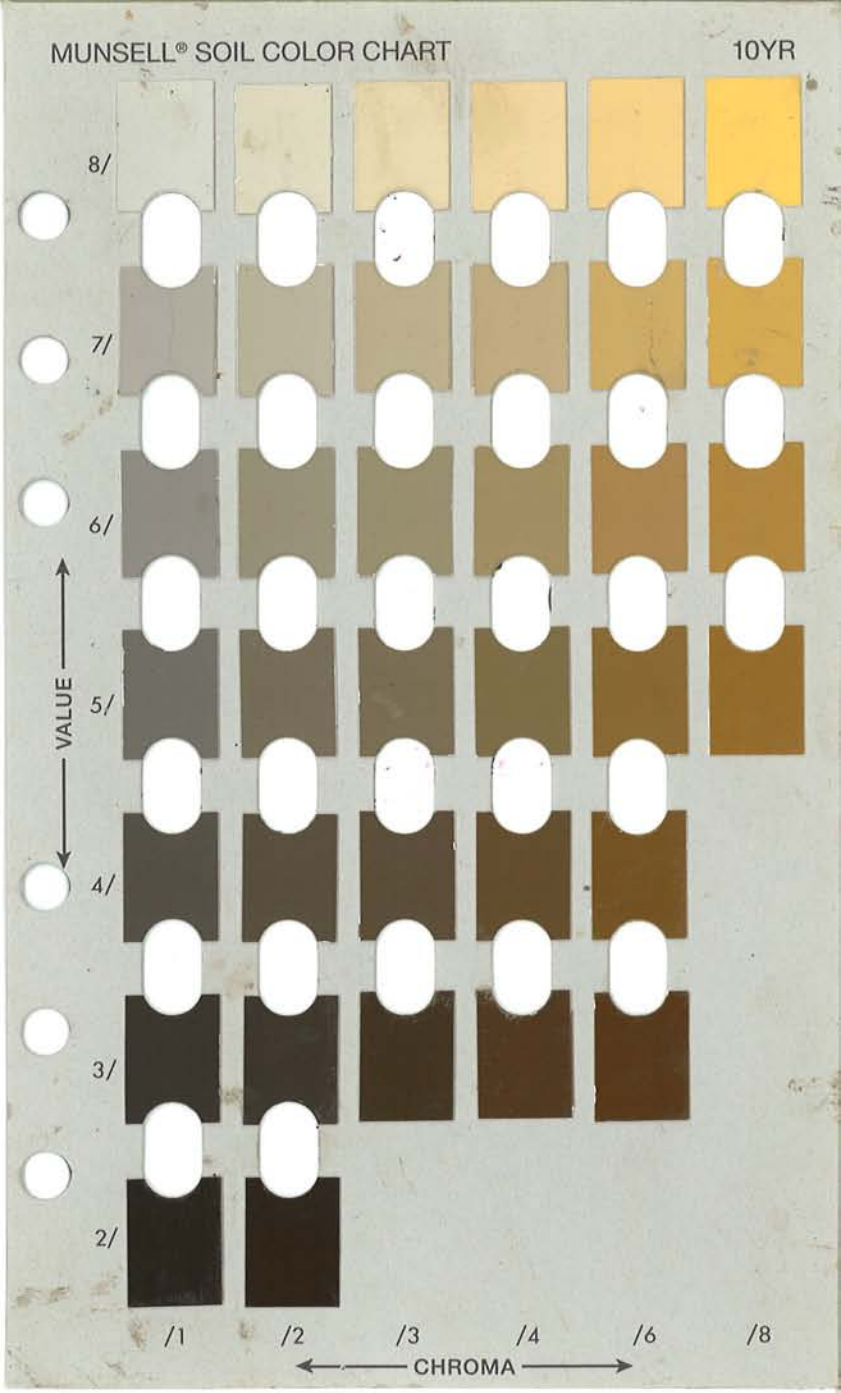
HUE 7.5YR MUNSELL® SOIL COLOR NAME DIAGRAM



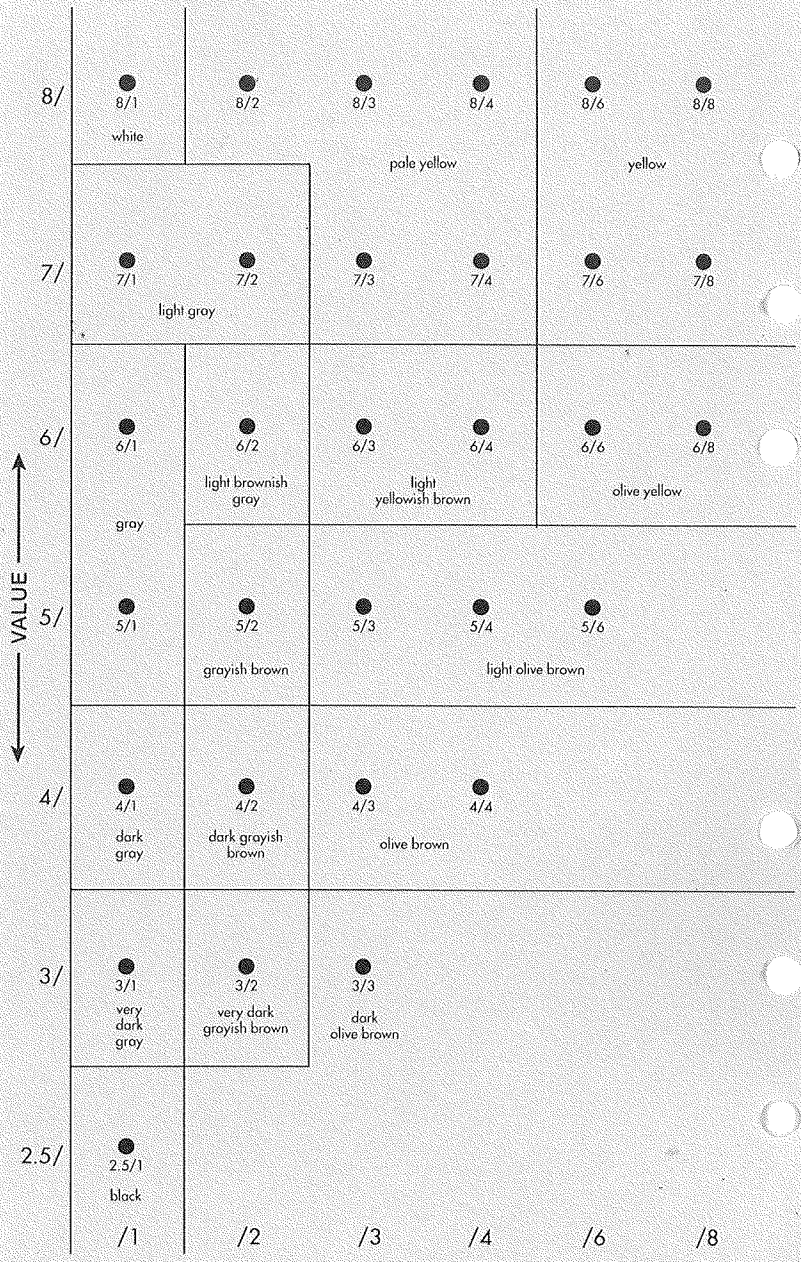

MUNSELL® SOIL COLOR CHART
7.5YR
8/
7/
6/
5/
4/
3/
2.5/
VALUE
/1
/2
/3
/4
/6
/8
CHROMA

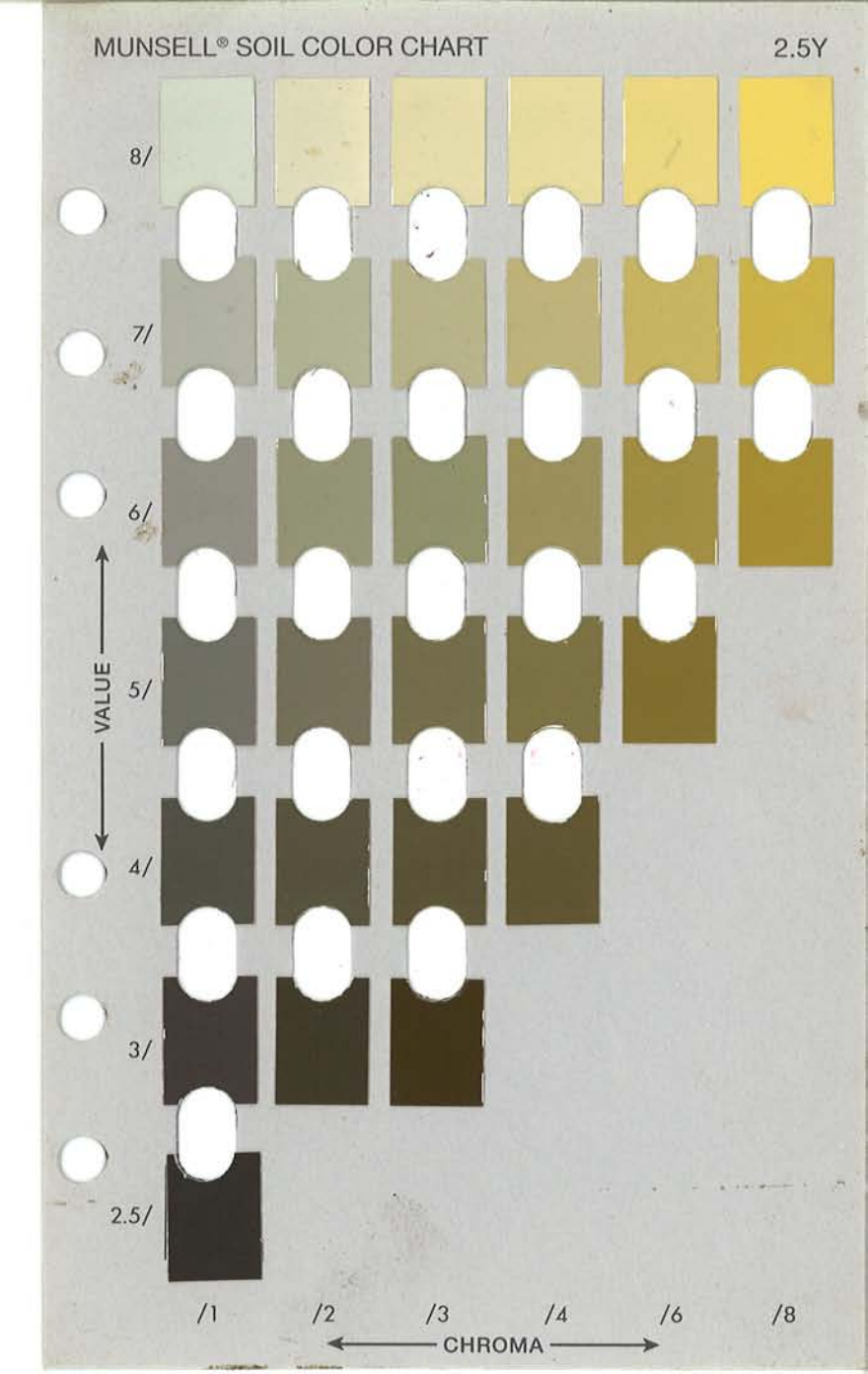
HUE 10YR MUNSELL® SOIL COLOR NAME DIAGRAM

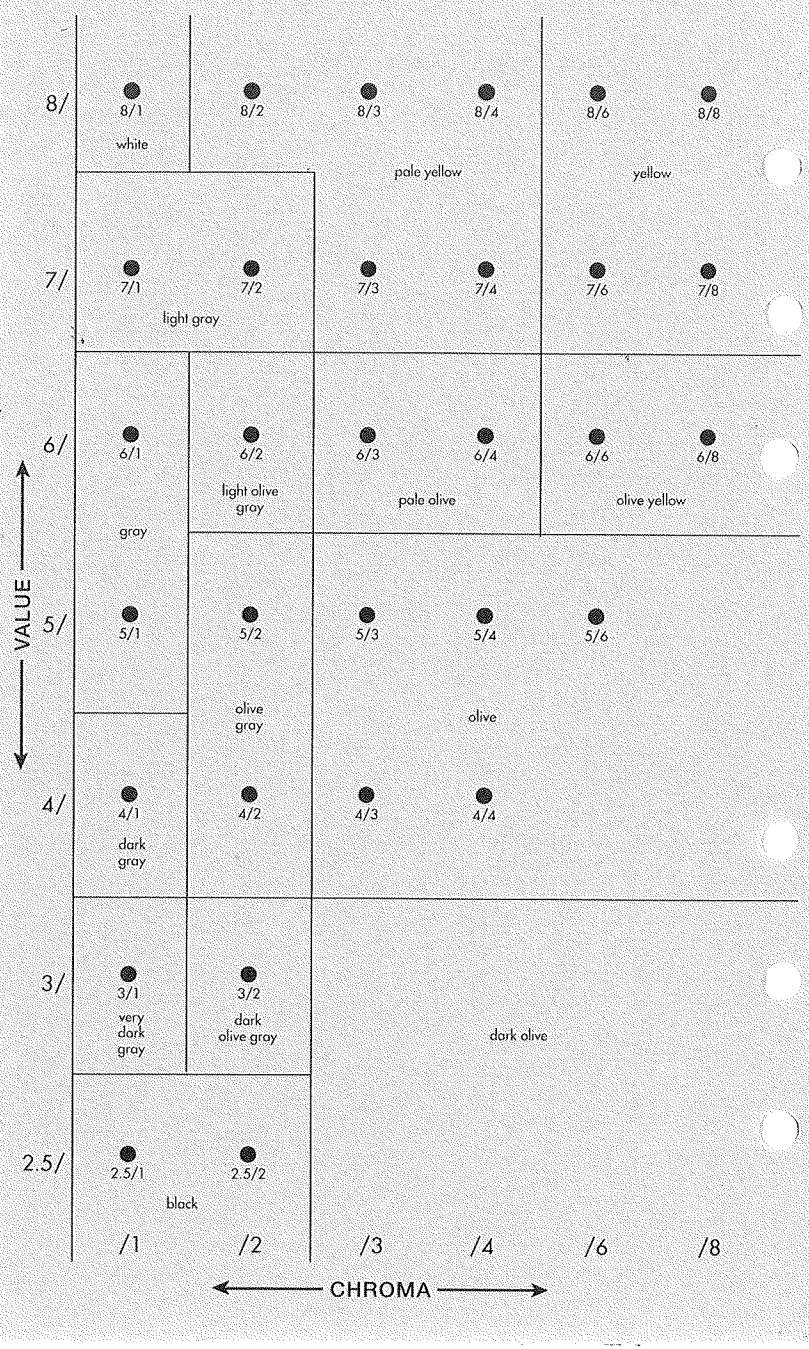
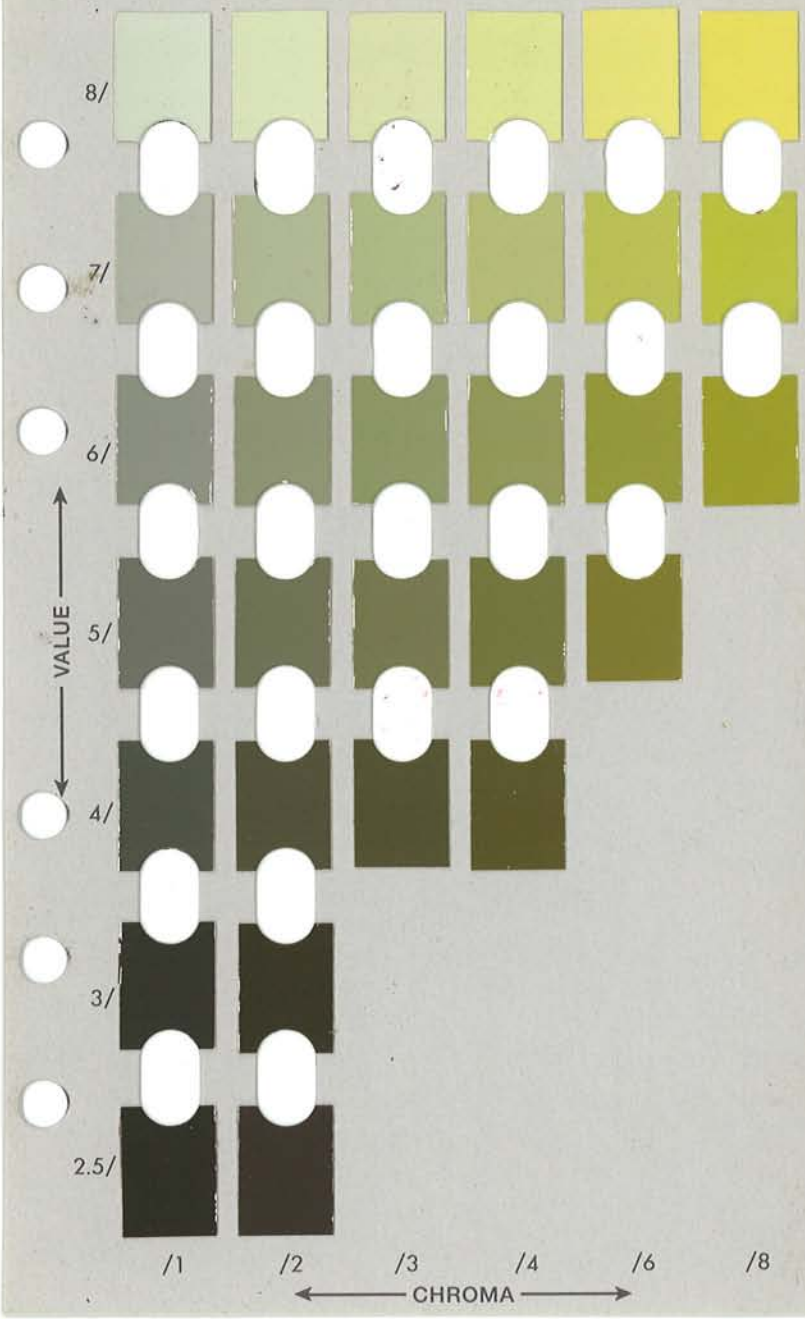



MUNSELL® SOIL COLOR CHART
10YR
8/
7/
6/
5/
4/
3/
2/
VALUE
/1
/2
/3
/4
/6
/8
CHROMA

HUE 2.5Y MUNSELL® SOIL COLOR NAME DIAGRAM




MUNSELL® SOIL COLOR CHART
2.5Y
8/
7/
6/
5/
4/
3/
2.5/
VALUE
/1
/2
/3
/4
/6
/8
CHROMA


HUE 5Y
MUNSELL® SOIL COLOR NAME DIAGRAM
8/
7/
6/
5/
4/
3/
2.5/
VALUE
8/1
white
8/2
8/3
8/4
pale yellow
8/6
8/8
yellow
7/1
7/2
light gray
7/3
7/4
7/6
7/8
6/1
gray
6/2
light olive gray
6/3
6/4
pale olive
6/6
6/8
olive yellow
5/1
5/2
olive gray
5/3
5/4
olive
5/6
4/1
dark gray
4/2
4/3
4/4
3/1
very dark gray
3/2
dark olive gray
dark olive
2.5/1
black
2.5/2
/1
/2
/3
/4
/6
/8
CHROMA

MUNSELL® SOIL COLOR CHART 5Y