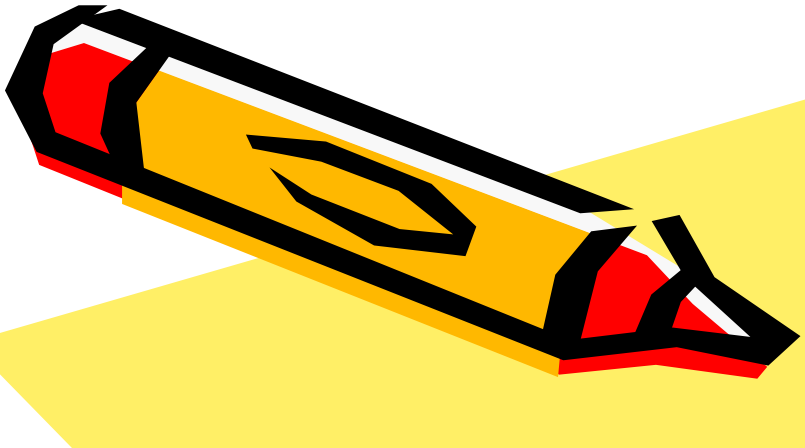
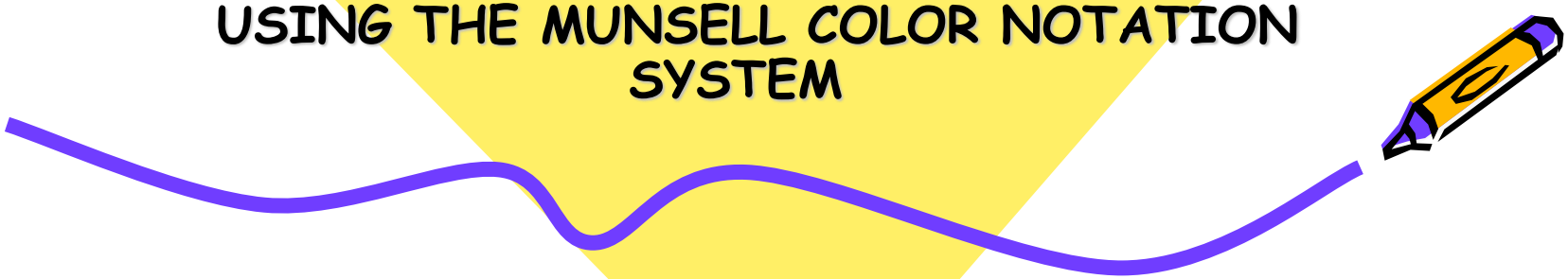


SOIL COLOR

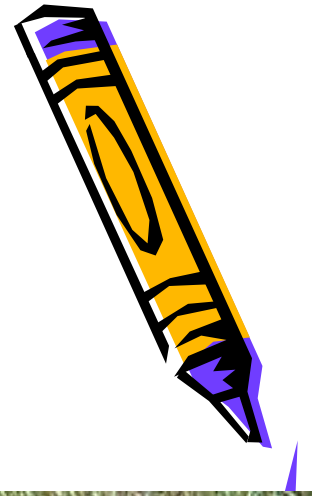
LABORATORY #2:
USING THE MUNSELL COLOR NOTATION SYSTEM



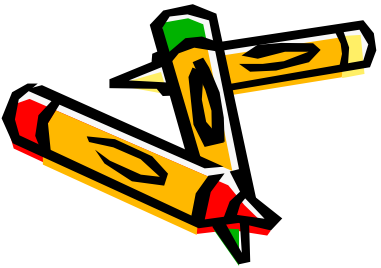
SOIL COLOR

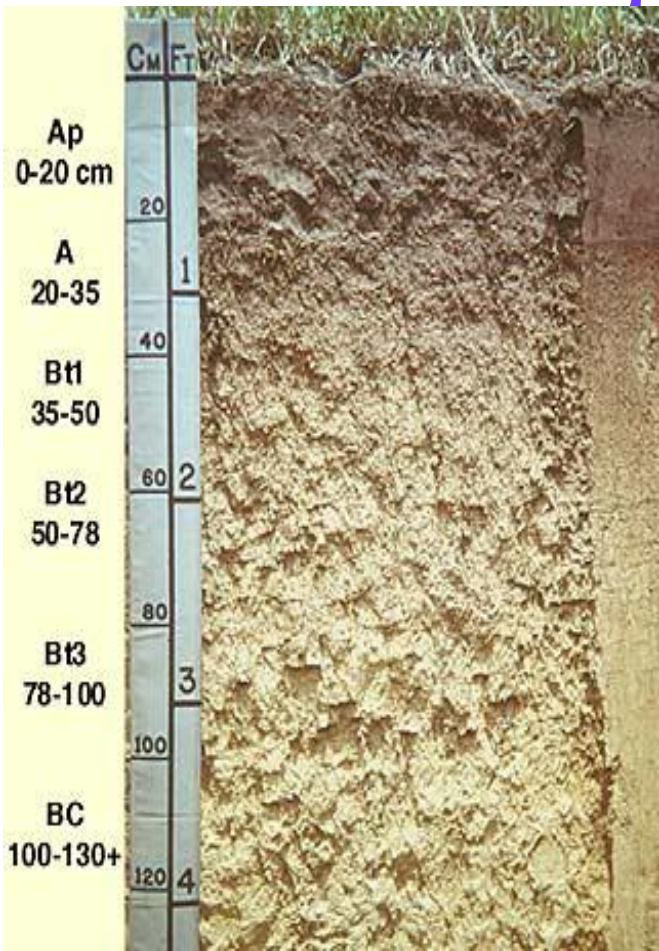
- Easily determined soil characteristic
- Information about soil properties
  - Organic matter content (surface layers)
  - Internal drainage (subsurface layers)
  - Used to differentiate soil horizons

MUNSELL COLOR NOTATION SYSTEM

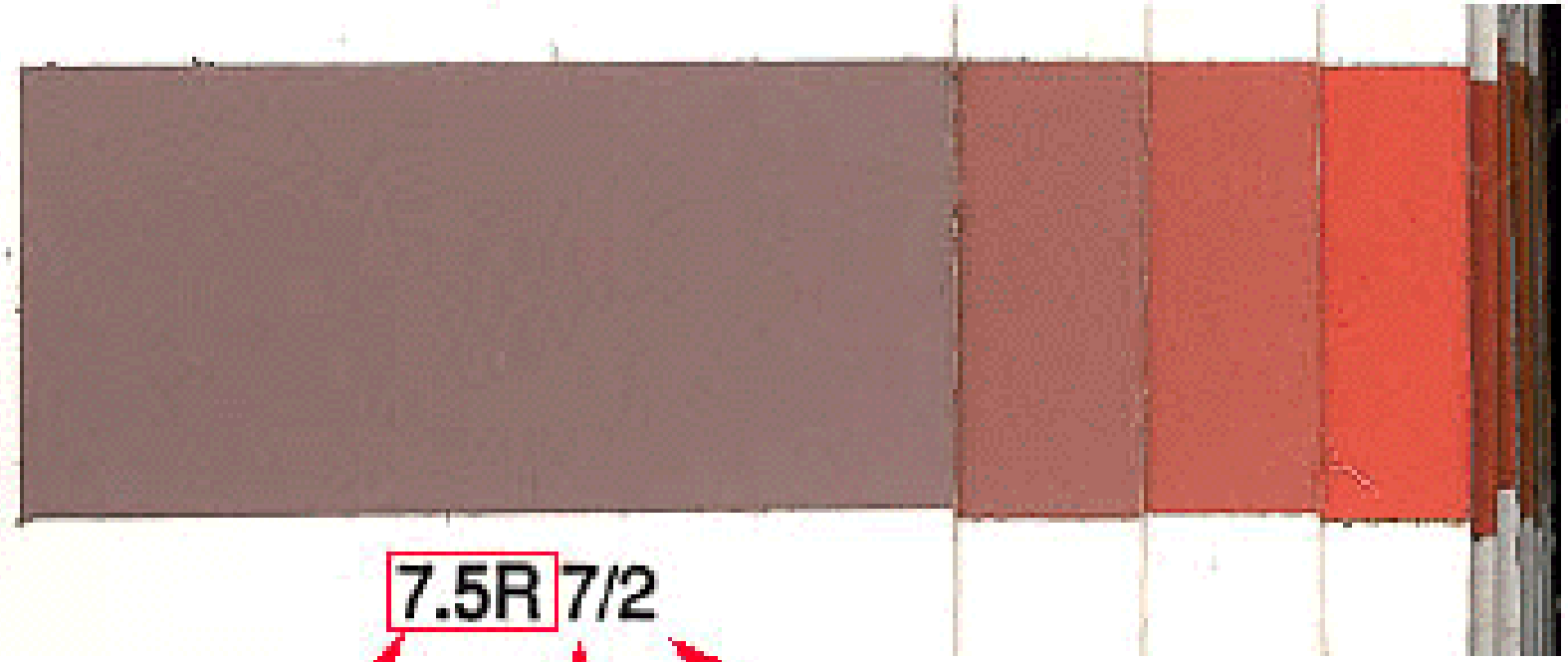


- Compares soil colors with color chart
- Munsell color notation uses three color variables
  - Hue
  - Value
  - Chroma



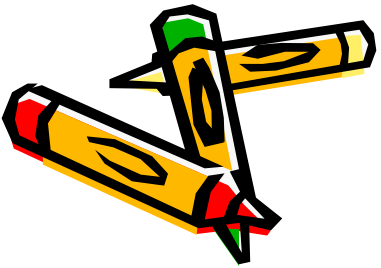


MUNSEL COLOR NOTATION SYSTEM



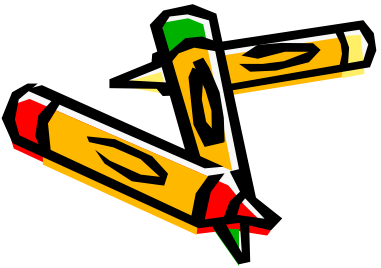
MUNSELL COLOR NOTATION VARIABLES

- **Hue**
  - Dominant spectral (rainbow) color
  - **Yellow**, **red**, **green** or **yellow-red**
  - 5YR is an equal mixture of yellow and red
  - 8YR has more yellow than red



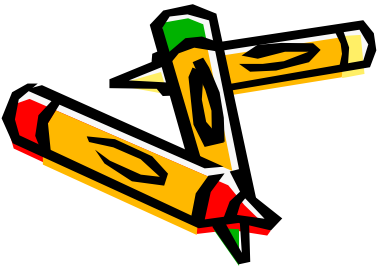
MUNSELL COLOR NOTATION VARIABLES

- **Value**
  - Modified by addition of gray to pure color (hue)
  - Property of gray color
  - Mixture of pure white pigment (10) and pure black pigment (0)
  - Value = 5: equal white and black
  - Value <5: more black than white
  - Value > 5: more than white black

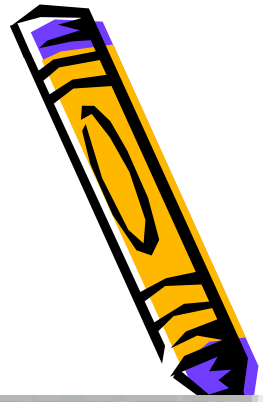


MUNSELL COLOR NOTATION VARIABLES

- **Chroma**
  - Amount of pure hue mixed with a gray to obtain the actual color
  - Chroma = 1: addition of one unit of pure hue to a certain amount of gray
  - **The lower the chroma the grayer the color**

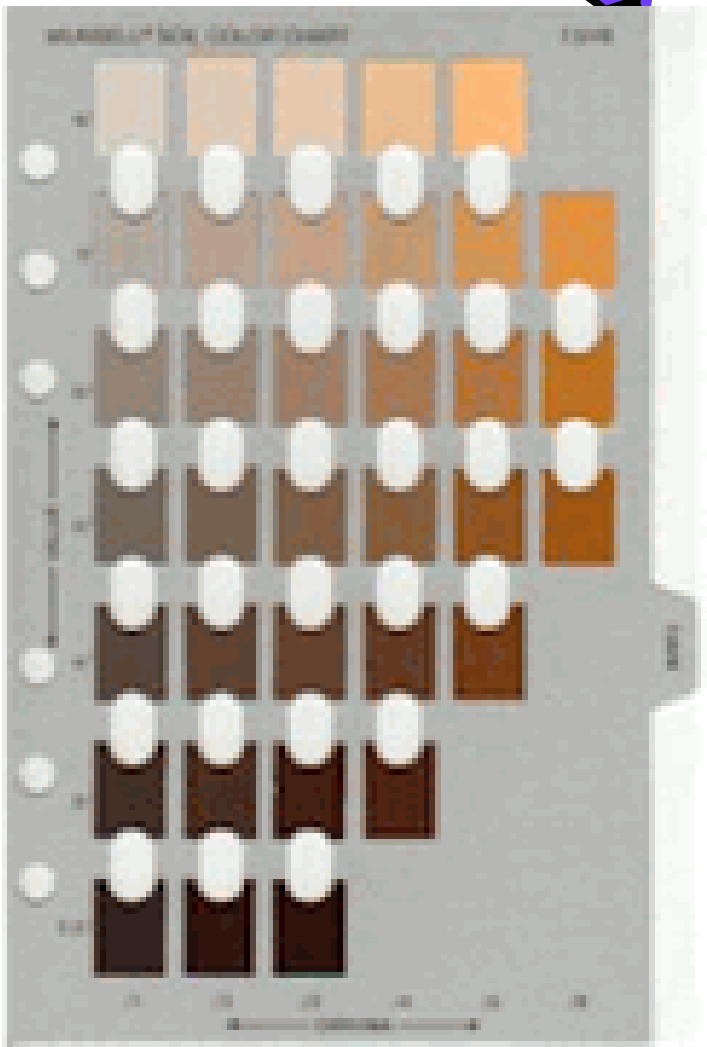


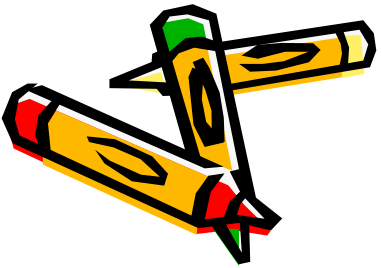
DETERMINATION OF SOIL COLOR



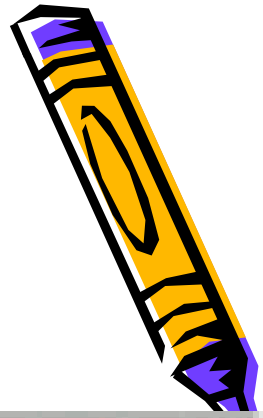
- Two complimentary systems
  - Color names – less precise

  Munsell notation of color – more precise

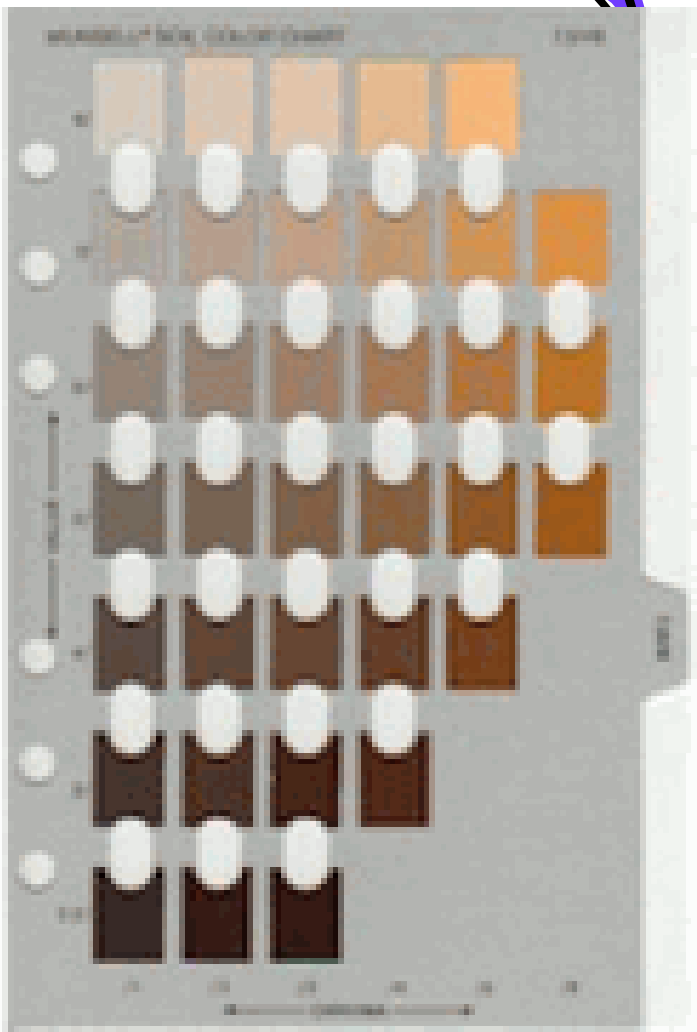


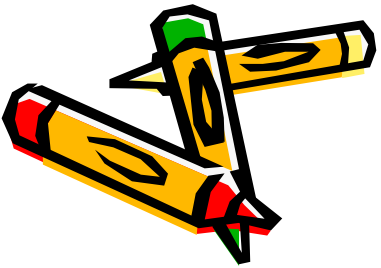


DETERMINATION OF SOIL COLOR

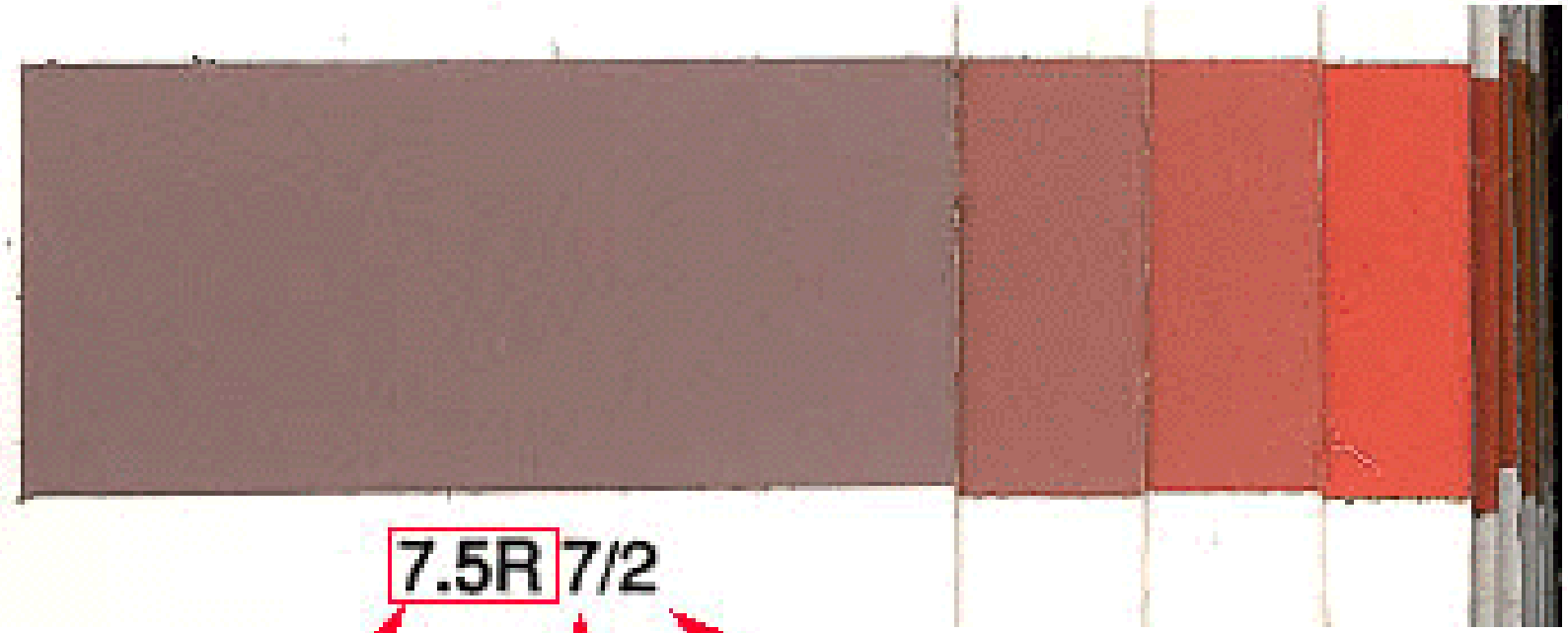


- **Soil color charts**
  - Collection of color chips of constant hue arranged by value and chroma



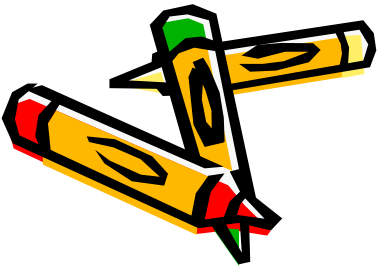


DETERMINATION OF SOIL COLOR



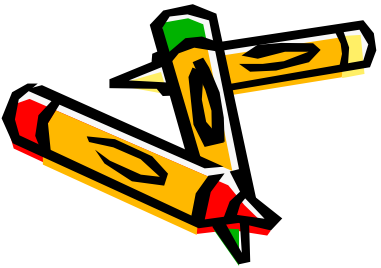
DETERMINATION OF SOIL COLOR

- **Color chips** are for a constant value
- **Chromas** increase from left to right
- **Values** decrease from top to bottom



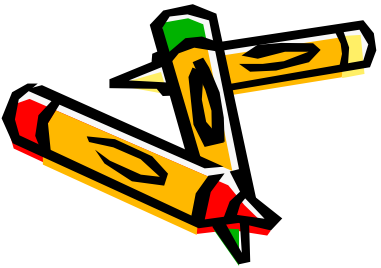
DETERMINATION OF SOIL COLOR

- Soil color is determined by matching a **moist** soil sample with the corresponding color chip
- Difficulties with soil color charts:
  - Selecting proper hue card
  - Determining intermediate colors
  - Distinguishing between values and high chromas



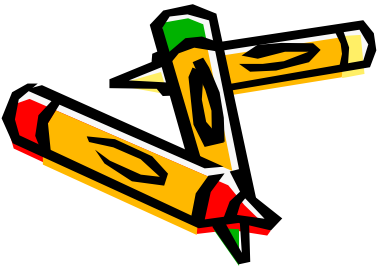
DETERMINATION OF SOIL COLOR

- Hue, value, and chroma are recorded
- **Notation:** 5YR5/4 = **reddish brown**
- Color is given in integer (whole) numbers
- Decimals, but never fractions
- Colors are given for moist soils



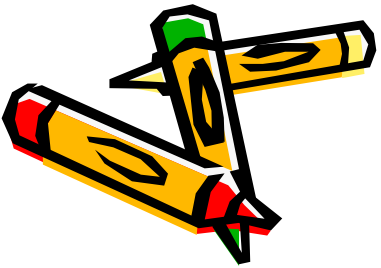
INTERPRETATION OF SOIL COLOR

- Soil color is a function of:
  - Presence of **organic matter** (OM) or humus
    - **Black** or **brown**
  - **Oxidation** status of iron compounds in lower horizons
    - **Reds** and **yellows** for well-drained soils
    - Neutral **grays** in poorly drained soils



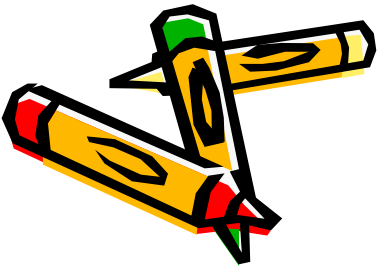
SOIL ORGANIC MATTER

- Most accurate with medium and fine textured soils (**Table 1-1**)
- Soils with > 50% sand and < 10% clay usually contain less OM than predicted
- **Herbicide** performance is influenced by OM levels

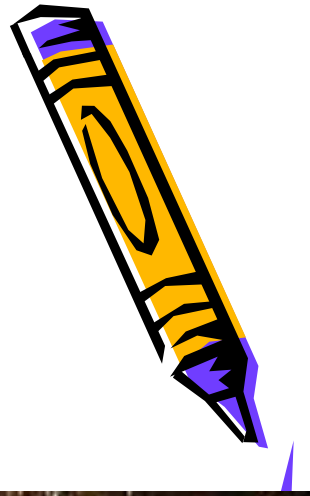


SOIL DRAINAGE CLASSES

- Determined by colors and color patterns of lower (subsoil) horizons
- **Reds:** presence of unhydrated iron and manganese oxides and stable only in well-aerated soils
- **Yellows:** presence of hydrated iron oxides and occupy wetter landscapes

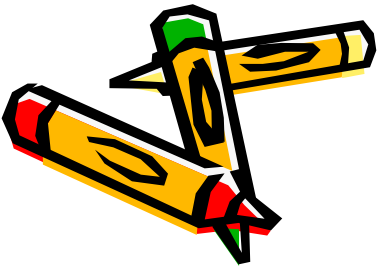


SOIL DRAINAGE CLASSES

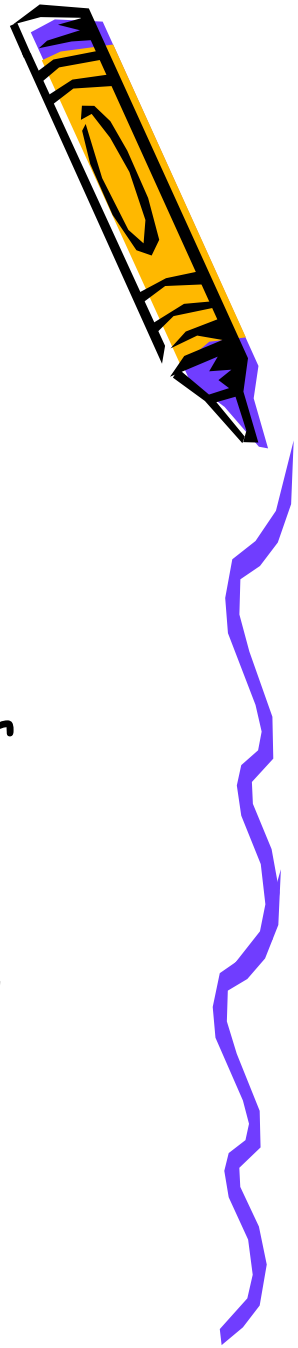


- **Grays** and whites: Caused by quartz, kaolinite, clay, calcium, limestone and reduced iron compounds

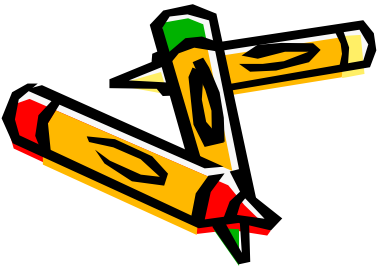
- **Darkest grays** (chroma <1): found in permanently saturated soil horizons and may have a **bluish** appearance



SOIL DRAINAGE CLASSES



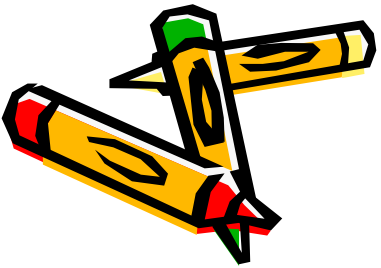
- Soil horizons may be:
  - **Uniform**
  - **Streaked** – clays, OM, iron oxides
  - **Spotted** – carbonates/organic matter
  - **Variegated**
  - **Mottled** – fluctuating water tables including mixtures of red, yellow, and grey colors



NATURAL DRAINAGE CLASSES

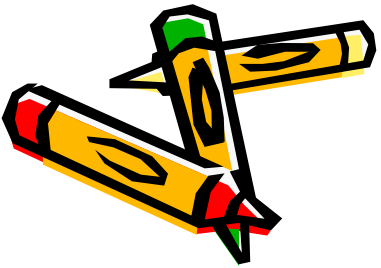
- **Very poorly drained**
  - Depressional areas with ponding water
  - Black or dark gray surface horizons
  - Light gray color under surface horizons

- **Poorly drained**
  - High water tables or slowly permeable layers
  - Mottling under the surface horizons
  - Light gray in lower horizons



SUMMARY

- Munsell color notation system
  - Hue
  - Value
  - Chroma
- Determination of soil color
- Interpretation of soil color



SUMMARY

- Soil organic matter
- Soil drainage classes
- Natural drainage classes