It's All About Color

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A. Coloring Hair Red

Pre-Treatment of Hair

- Sensitivity to copper
- Sources of copper
- Clarify with EDTA and ammonium lauryl sulfate
- Apply to towel dried hair

Formulating for Red Color

- "Gray", 3:1 or 1:1 ratio
- 3:1, 1 1/2oz. 4RO + 1/2oz. 3N
- 1:1, 1oz. 4RO + 1oz. 4N
- No "Gray", use full strength red, 4RO

Formulas for Red Shades

1. 45g 4RO + 15g 3N

2. 30g 4RO + 30g 4N

3. 4RO on Brown Hair

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Developer for Red

- Natural Blondes, 10-volume
- Light Brown, 10 to 20-volume
- Medium to Dark Brown, 20 to 30-volume

Underlying Pigment

Irish Reds

Tend to be lighter and softer red-orange shades.

French Reds

Tend to be brighter red shades

Italian Reds

Tend to be deeper with red-violet tones.

Scottish Reds

Tend to be deeper golden browns with undertones of red.

American Reds

Tend to be softer mid-range red browns.

Timing

- Minimum 35 minutes
- Excluding toners and refreshers
- 17 minutes with steam-heat
- Do not use dryer heat

B. Eye Color

- Blue
- Green
- Brown
- Amber

Eye Colors
Strum and Frudakis (2004) Trends in Genetics 20:327

B. Eye Color

- Blue
- Green
- Brown
- Amber
- Violet

B. Eye Color

- Blue eyes contain a small amount of eumelanin is found on the back of iris. This is the same eumelanin that creates hair and skin color.

B. Eye Color

- Green eyes are blue eyes with a little more eumelanin on the front of the iris and contain a second pigment, lipochrome, a yellow, yellow-brown pigment.

B. Eye Color

- Brown eyes contain a larger amount of Eumelanin on both the front and back of the iris.

B. Eye Color

- Amber eyes contain lipochrome, the yellow, yellow-brown pigment.

B. Eye Color

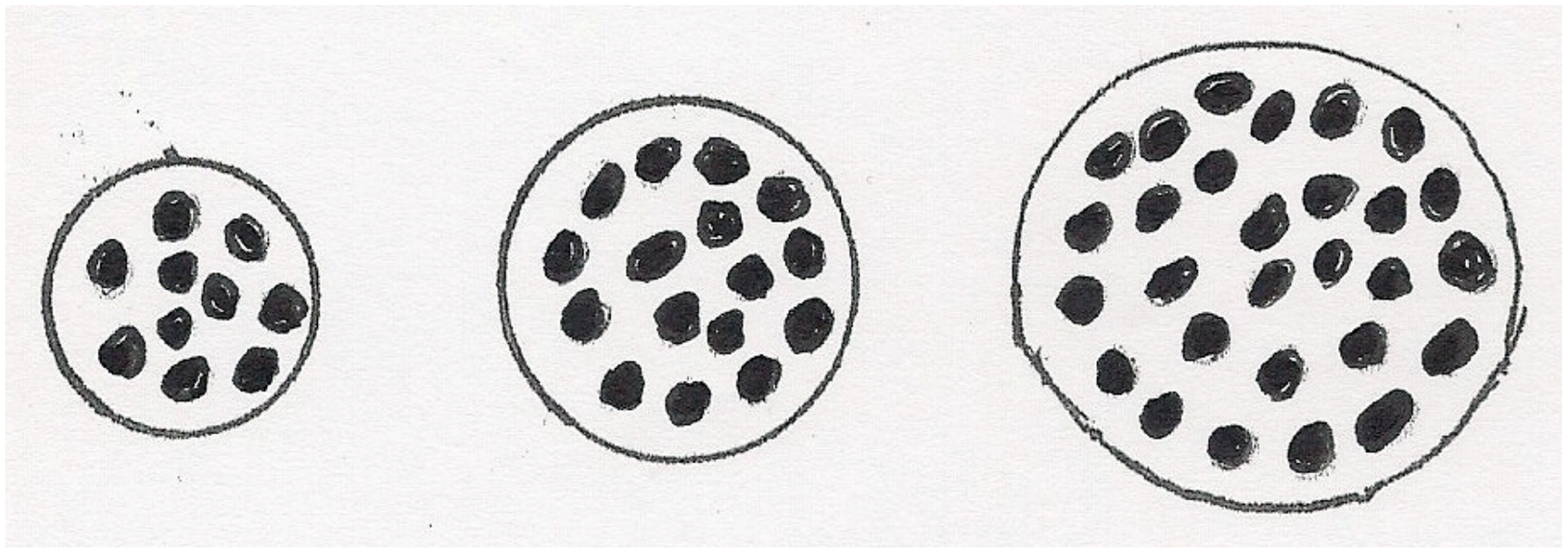
- Violet eyes are blue eyes with a reflection of red from the blood vessels in the back of the eye.

B. Eye Color

- The darker the eye color the more difficult to lighten the hair.
- Green eyes are often an indicator of red pigment in the hair.

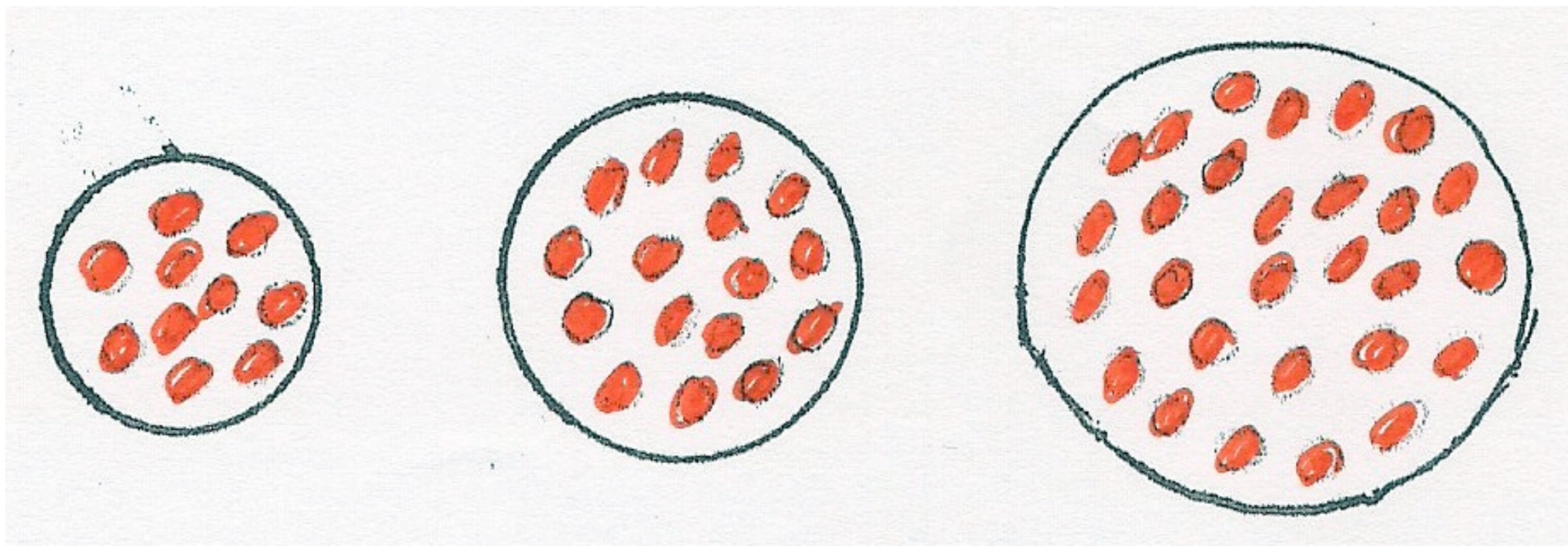
C. Why Texture is Important

- Fine, medium and coarse hair at the same level react differently.
- Fine hair has less pigment and often requires a lower developer.
- Coarse hair has more pigment and can require a stronger developer.



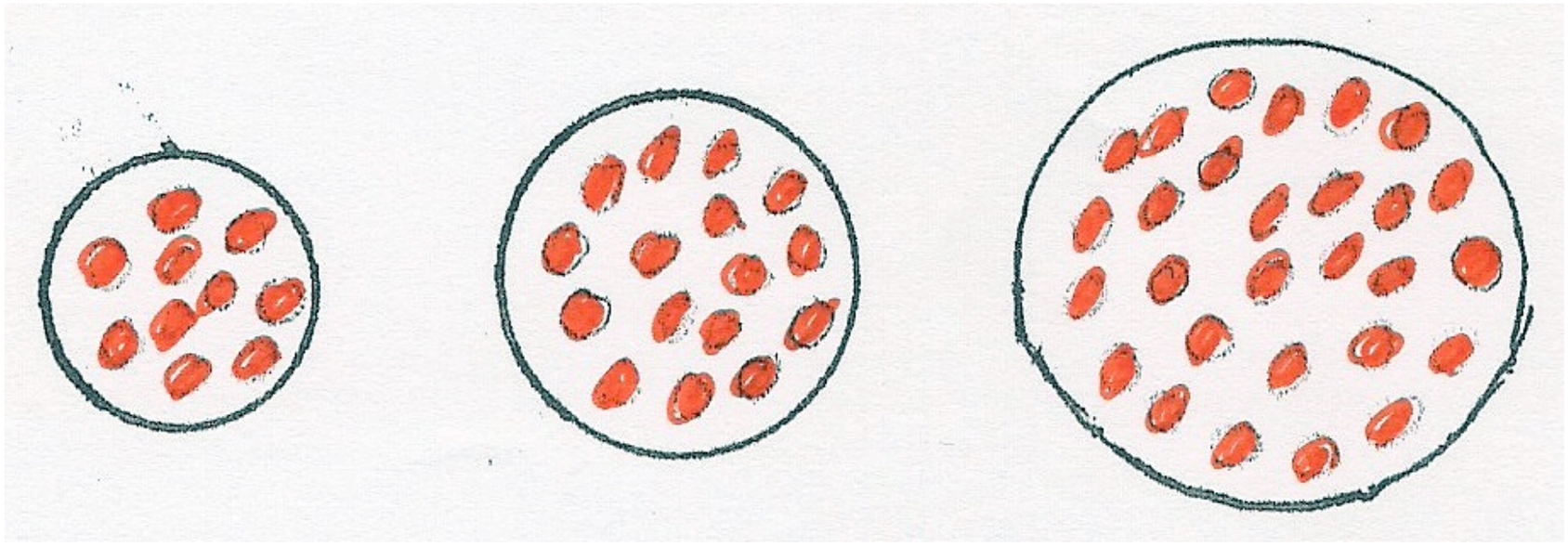
D. More About Texture

- Texture influences the contributing pigment.



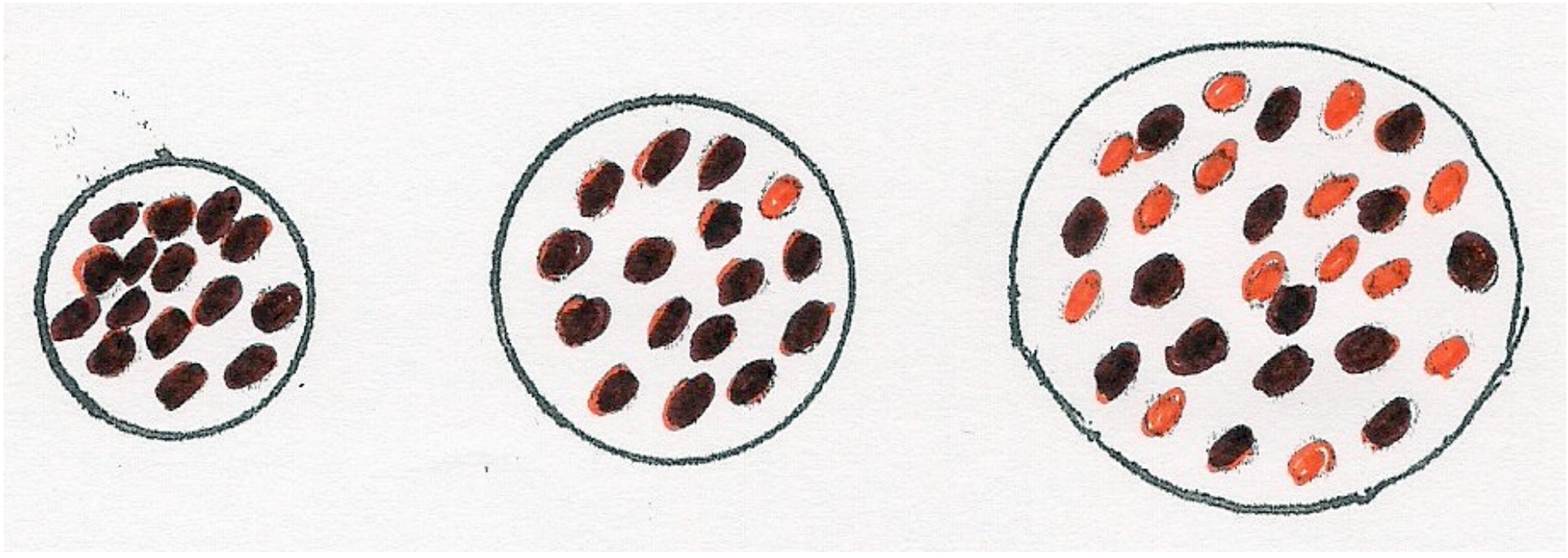
D. More About Texture

- Texture influences the tone and depth of the formula.



D. More About Texture

- Each texture appears different after coloring.



E. Creating the Formula

- Start with the primary tone; red, gold, neutral or ash.
- Make it the majority of the formula. 1 1/2 oz.
- Add a small amount of secondary. 1/2 oz.
- Make the secondary 2 or 3 levels darker.

F. Unusual Formulations

Use stronger secondary color when neutral is the primary. Use 4RO instead of 6RO.

1. 45g 4N + 15g 6RO (left)

2. 45g 4N + 15g 4RO (right)

F. Unusual Formulations

Use less developer but higher volume.

1. 60g 8N + 60g 20-vol. = 10 working-volume. (left)

2. 60g 8N + 45g 30-vol. = 12.8 working-volume. (right)

G. Using Concentrates

- Neutral to create opaqueness. (NN)

- Gold to add warmth and achieve “gray” coverage without neutral.

- Green to create ash or beige.

- Red for intensity and wearability.

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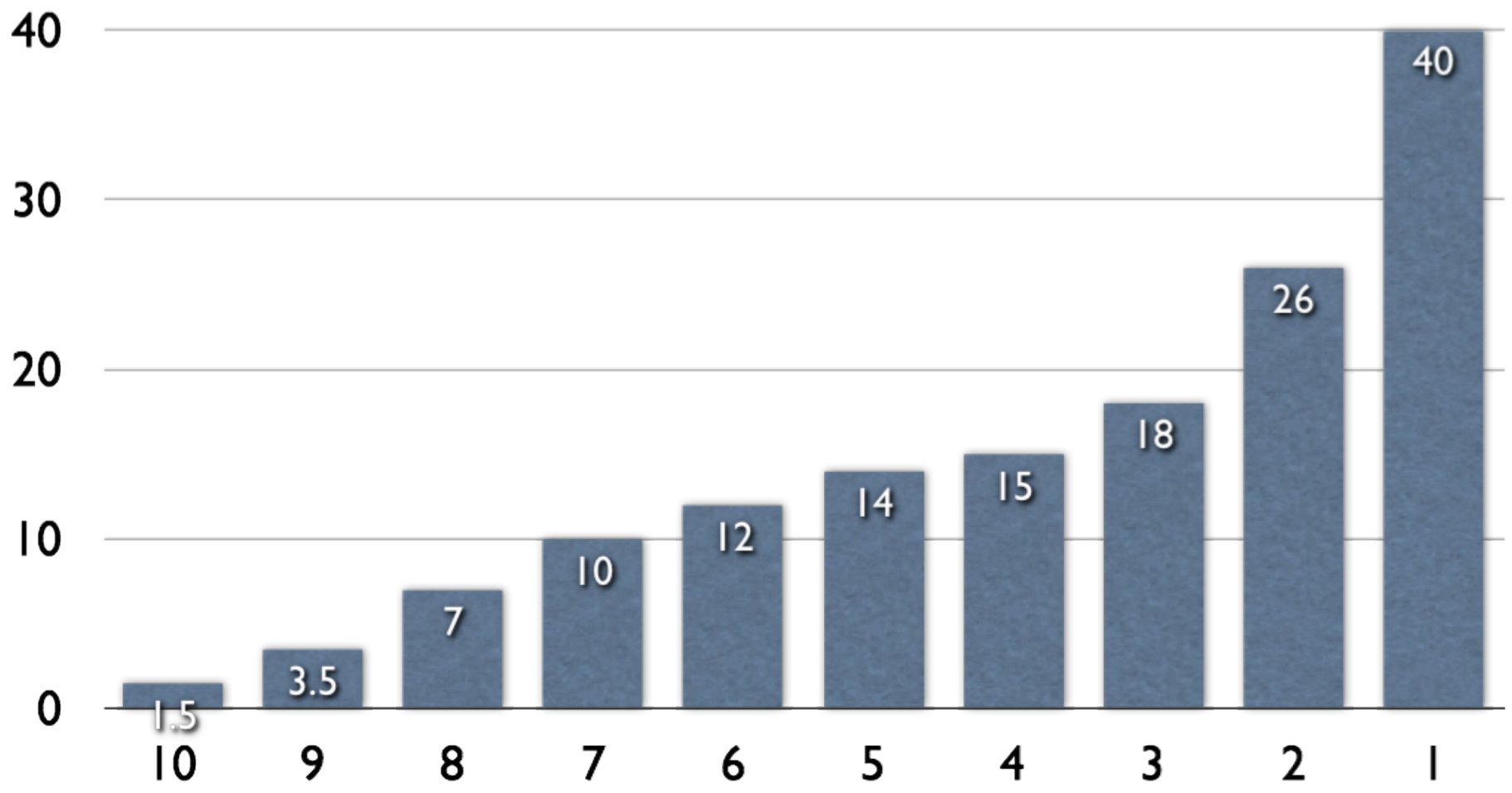
H. Creating Levels by Varying Concentrations

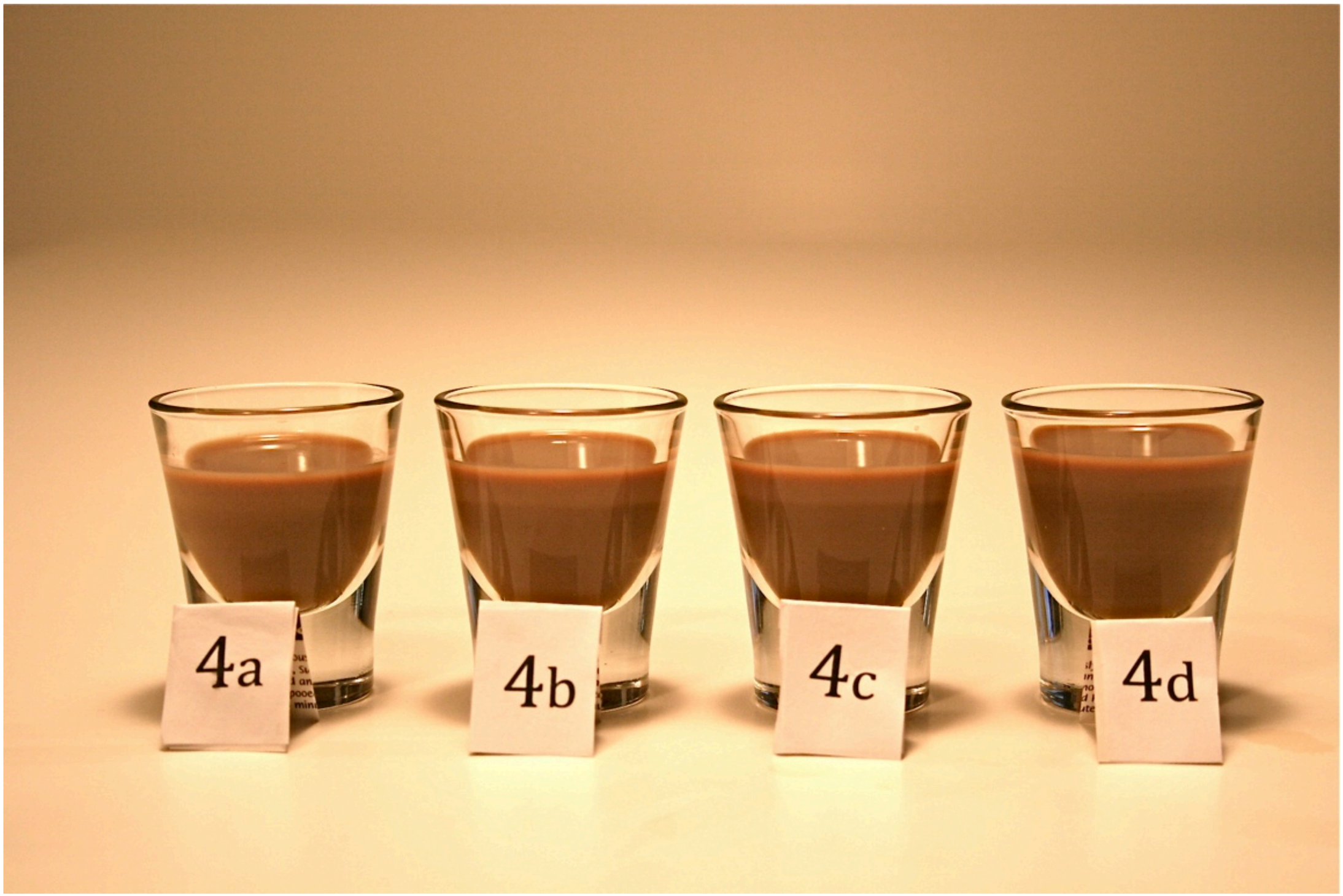
- Light, medium and dark dyes do not exist.
- Depth is a function of concentration
- Visualize milk and chocolate

Creating Levels by Varying Concentrations



Creating Levels by Varying Concentrations

Internal Levels



Tonal Concentrations

I. Mixing Formula vs. Working Formula

- What you mix is not always what you apply.
- Generally, the level of color becomes approximately one level lighter for each one-half-ounce (15g) of a different tone that is added to the formula.

Mixing Formula vs. Working Formula

- Mixing Formula, 4N
- Working Formula, 4N

Mixing Formula vs. Working Formula

Mixing Formula

45g 4N + 15g 4RO

Mixing Formula vs. Working Formula

Mixing Formula,
45g 4N + 15g 4RO

Working Formula
45g 4N +15g Clear (right)

Mixing Formula vs. Working Formula

Mixing Formula,
45g 4N + 15g 4RO

Working Formula
45g Clear +15g 4RO (right)

Mixing Formula vs. Working Formula

Mixing formula,
45g 4N + 15g 4RO

Working formula,
5N, 7RO = Level 6

Mixing Formula vs. Working Formula

- Mixing formula, 45g 4N + 15g 4RO
- Working formula. 5N, 7RO = Level 6

J. Steps to Creating Hair Color

- Start with deionized water
- Add an anti-oxidant and humectant
- Add the dyes and couplers and heat
- Add the base mixture
- Add the conditioners
- Cool the mixture and add the alkalizer

K. Typical Hair Color Ingredients

1-PHENYL-3METHYL-5PYRAZOLONE, coupler
2,4-DIAMINOPHENOXYETHANOL HYDROCHLORIDE, coupler
2-METHYL-5-HYDROXYETHYLAMINOPHENOL, coupler
2-METHYLRESORCINOL coupler
M-AMINOPHENOL, coupler
N,N-BIS-HYDROXETHYL-P-PHENYLENEDIAMINE SULFATE, dye
P-AMINO-O-CRESOL, coupler
P-AMINOPHENOL, dye
P-PHENYLENEDIAMINE, dye
P-TOLUENEDIAMINE SULFATE, dye
L-NAPHTHOL, coupler
RESORCINOL, coupler
AMMONIUM HYDROXIDE, alkalizer
AMINOMETHYLPROPANOL, alkalizer
ETHANOLAMINE, alkalizer
CETEARETH 20, emulsifier and thickener
CETYL ALCOHOL, thickener
DIBUTYL ADIPATE, solvent and lubricant
EDTA, kelator
ISOASCORBIC ACID, antioxidant
OLEYL ALCOHOL, softening and emollient
PROPYLENE GLYCOL, humectant
SODIUM SULFITE, anti-oxidant
STEARYL ALCOHOL, emulsion stabilizer
WATER
FRAGRANCE

L. Differences Between Manufacturers

- All use the same dyes but choose different combinations for each shade. (4N vs. 4N)
- All use the same alkalizers. Ammonia, ethanolamine and aminomethylpropanol.
- All have the same pH with slight variations. Permanent pH-10.5, Demi-pH-8.5

M. How Dyes Form

- Adding hydrogen peroxide to the mixture activates the dye intermediates
- Activated dye intermediates couple
- Dye intermediates and couplers form permanent dyes
- Permanent dyes increase in size and cannot exit the hair.

N. Brown vs. Brown

- Combine red, yellow and blue, Generally used in paints and non-oxidative coloring
- Use p-phenylenediamine + resorsinal, Most common formula
- Use p-toluenediamine + resorsinal
- Use p-toluenediamine + 2-methylresorsinal

O. Hydrogen Peroxide

- Water with an extra oxygen molecule.
- Water HOH
- Peroxide HOOH

Hydrogen Peroxide

- HOOH ⇨ HOH + O provides activation for dye intermdiates.
- HOOH ⇨ 2 OH lightens the natural melanin.
- OH damages the hair

Hydrogen Peroxide

- The higher the volume, the more OH
- The more OH, the more damage.
- The higher the volume, the more damage to the hair.

Hydrogen Peroxide

- What happens if you leave the top off the bottle.
- Nothing, or the peroxide get slightly stronger.
- Peroxides are stabilized to prevent decay.

P. Ammonia vs. Non-Ammonia

With Ammonia	With Ethanolamine
Oxidative dyes	Oxidative dyes
pH-10.5	pH-10.5
10, 20, 30, 40-volume	10, 20, 30,40-volume
1 to 1.5% ammonia	8 to 10% ethanolaimine
Lightens 2 levels/20-v	Lightens 1.5 levels/20-v
Completely washes out	Leaves an MEA residue

Q. “Gray” Hair

- Gray hair is an optical illusion
- It is white and pigmented mixed together
- White and Blonde = Pearl gray
- White and Brown = Slate gray

“Gray” Hair

- Is not more resistant to dye penetration
- It lacks pigment which contains iron, zinc and magnesium.
- Fe, Zn and Mg catalyse dye mixture for faster processing.

R. Better "Gray" Formulas

- Don't lighten more than 3 levels, this prevents orange.
- Don't use levels 8, 9 or 10 on medium to deep brown hair, they encourage brass.
- Use 25-volume developer for better blending and better coverage.
- Add highlights for lighter results.
- Use steam heat, not a dryer.

“Gray” Blending

- Use a SuperGlaze for “gray blending.
- A SuperGlaze is an equal blending of permanent and deposit-only color, mixed with 20-volume developer and applied for 20 to 35 minutes.
- It lightens on 1level, thus preventing orange and allows blending of blonde and brown.

S. Permanent Color vs. Deposit-Only

Permanent Hair Color	Demi/Deposit-Only
Oxidative dyes	Oxidative dyes
pH-10.5	pH-8.0
10, 20,30,40-volume	7.5, 10, 12-volume
Ammonia or Ethanolamine	Ethanolamine or Aminomethylpropanol
1 to 4 levels of lift	0 to 1 level of lift

T. Extraordinary Ingredients

Extraordinary Ingredients

- Sunflower seed extract
- Silicone and silicone SME 253
- Hydrolyzed wheat protein
- Hydrolyzed rice protein
- Macadamia glycerides
- Keravis

Sunflower Seed Extract

- Protects color of dried hair from wash-out and from daily UV exposure.
- More than four times better than Vitamin E Acetate

Silicones

- Silicones provide manageability and silkiness
- Silicone SME 253 helps improve color retention

Hydrolyzed Wheat Protein

- Repairs damaged hair through covalent bonding. It builds body, reduces porosity and improves shine, luster and smoothness

Hydrolyzed Rice Protein

- Highly pure protein produced naturally from rice that repairs damaged hair.
- It conditions the hair with its moisture retention and film-forming properties.
- It helps improve the body, shine and smoothness of the hair.

Macadamia Glycerides

- Provide added manageability while conditioning and providing shine.

Keravis

- A powerful hair-strengthening complex that dramatically improves the condition of damaged hair. It has a unique chemical composition of low and high molecular weight components. The lower weight components penetrate the cortex and plasticize the hair by moisturizing from within while the higher molecular weight components form a film on the hair shaft that lubricates and reinforces the cuticle. These properties combine to strengthen the hair, thus, helping to reduce the degree of damage hair sustains from chemical treatments, environmental stresses or styling practices.