STRONG TOWER ACADEMY, IKORODU, LAGOS.

WEEK: 3RD WEEK NOTE

CLASS: SS 2

SUBJECT: DYEING & BLEACHING

TOPIC: ART TERMINOLOGIES IN DYEING AND BLEACHING

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Essential Art Terms in Dyeing and Bleaching:

Absorbency: The ability of one material to take up another material.

Absorption: The process of gases or liquids being taken up into the pores of a fiber, yarn, or fabric.

Acetic acid: An organic acid (CH3COOH) widely used in textile applications. It is used in textile wet processing, dyeing and printing, and in the manufacture of cellulose acetate and cellulose triacetate.

Acetic, anhydride: Anhydrous acetic acid

[(CH3CO)2O]. It is used in the acetylation process in the manufacture of cellulose acetate.

Acetone: Diemthyl ketone (CH3COOH). One of the most powerful organic solvents. Acetone dissolves secondary cellulose acetate and other derivatives of cellulose. It is miscible with water and has a low boiling point(55-56oC)

Acid: Having a low pH.

Acid dyes: An anionic dye having substantivity for fibers (e.g. Protein, polyamide) which contain cationic groups usually in acidic or neutral aqueous dyebaths. Acid dyes are often applied to fabric in organic or inorganic acid dyeing solution.

Acid-dyeable variants: Polymers modified chemically to make them receptive to acid dyes.

Acidic: A term describing a material having a pH of less than 7.0 in water.

Activated oxygen bleach: A bleaching system comprising an oxygen bleach and a bleach activator.

Add-on: The amount of materials applied to a textile is known add-on; it is calculated as the weight of solids left on a given weight of fabric after impregnation and drying. The percentage add-on is computed by the formula {(w2-w1) ×100}/ w1; where w1 is the initial weight of material before impregnation (wet-out), and w2 is the weight of material after impregnation and drying.

Additive: A supplementary material combined with a base material to provide special properties.

Adjective Dye: A dye that requires a mordant to be fast. Most natural dyes are adjective.

Adsorption: The attraction of gases, liquids or solids to surface areas of textile fibers, yarns, fabrics or any materials.

Aerobic: A biological process active only in the presence of oxygen.

Affinity: Chemical attraction; the tendency of two elements or substances to unite or Combine together, such as fiber and dyestuff. Affinity is usually expressed in units of joules (or calories) per mole.

Aftertreatment: Any treatment done after fabric production. In dyeing, it refers to treating dyed material in ways to improve properties; in nonwovens, it refers to finishing processes carried out after a web has been formed and bonded. Examples are embossing, creping, softening, printing and dyeing.

Ageing: Ageing consists of exposing printing goods to more or less prolonged action of steam at atmospheric pressure to assist in the diffusion & fixation of the dyes

Alkaline: A term used to describe a material having a pH greater than 7.0 in water.

Anaerobic: A biological process active only in the absence of free oxygen.

Aniline dyes: Dyes derived chemically from aniline or other coal tar derivatives.

Anionic dye: A dye dissociates in aqueous dyebath and provide negatively charged colored ion.

Anthraquinone dyes: Dyes that have Anthraquinone as their base and the carbonyl group (>C=O) as the

chromophore. Anthraquinone-based dyes are found in most of the synthetic dye classes.

Antichlor: A chemical, such as sodium thiosulfate , used to remove excess chlorine after bleaching.

Auxiliaries: Chemicals used to facilitate and modify the dyeing process. Most dyes require auxiliaries, though some (likeCountry Classics) come pre-measured with powdered auxiliaries.

Azo dyes: Dyes characterized by the presence of an azo group (-N=N-) as the chromophore. Azo dyes are found in many of the synthetic dye classes.

Azoic dyes: The dyes, produced by interaction of a diazotized amine (azoic diazo component) and a coupling component (azoic coupling component).

Bacterial Amylase Unit (BAU): A measure of starch degradation as shown by the quantity of an enzyme that will dextrinize one milligram of starch per minute under the specified experimental conditions.

Basic dyes: A class of positive-ion-carrying dyes known for their brilliant hues. Basic dyes are composed

of large-molecule, water-soluble salts that have a direct affinity for wool and silk and can be applied to cotton with a mordant.

Batch: A group of units of products of the same type, structure, colour and finish, class and composition, manufactured under essentially the same conditions and essentially at the same time, and submitted at any one time for inspection and testing. Similar word ‘Lot’.

Bath ratio: Ratio of bath to fiber as 20:1, 10:1 or 1:20, 1:10

Binder: The binder is a film forming substance made up of long chain macromolecules which when applied to textile together with the pigment; produce a three dimensionally linked network.

Bleaching: A process of whitening fibers, yarns, or fabrics by removing the natural and artificial impurities to obtain clear whites for finished fabric, or in preparation for dyeing and finishing. The materials may be treated with chemicals or exposed to sun, air, and moisture.

Bleeding: Color rinsing out of a finished garment, yarn,

or fiber. Bleeding can be excess dye that was not fully rinsed out or dye that was not properly set on the fiber. Indigo is an exception, see crocking.

Buffering Agent (Buffer): A chemical additive that helps stabilize the dyebath pH. Also improves leveling.

Carbonizing: A chemical process for eliminating cellulosic material from, synthetic and wool or other animal fibers. The material is reacted with sulfuric acid or hydrogen chloride gas followed by heating. When the material is dry, the carbonized cellulose material is dust-like and can be removed.

Carrier: A product added to a dye-bath to promote the dyeing of hydrophobic manufactured fibers and characterized by affinity for, and ability to swell, the fiber.

Cat-ion: A positively charged ion.

Cationic dyes: A dye that dissociates in an acidified, aqueous solution to give a positively charged colored ion.

Caustic Soda: The common name for sodium hydroxide

(NaOH)

Chrome dye: A mordant dye capable of forming a chelate complex with a chromium ion.

CIE: Commission internationaly de I’Eclairage.

CMC: Carboxymethyl cellulose. Synthetic size used in cotton fabric processing.

Colorant: A colouring matter, a dye or pigment which can produce colour in a substrate like fiber, yarn or fabric.

Coloration: A series of textile operation involved to impart color in textiles. It embraces dyeing, printing, painting, spraying and preparatory treatment as well.

Color: (Sensation) that characteristic of the visual sensation which enables the eye to distinguish differences in its quality, such as may be caused by differences in spatial distribution or fluctuation with time. (of an object) the particular visual sensation caused by the light emitted by, transmitted through, or reflected from the object.

Colour can be described approximately in terms of Hue, Saturation, and Lightness, or specified numerically by chromaticity coordinates. Alternatively , colour can be specified by reference to visual standards e.g. the Munsell Color Atlas.

Colorfastness: Resistance to fading; i.e the property of a dye to retain its color when the dyed (or printed) textile material is exposed to conditions or agents such as light, perspiration, atmospheric gases, or washing that can remove or destroy the color.

Color strength: A measure of the ability of a dye to impart color to other materials. Color strength is evaluated by light absorption in the visible region of the spectrum.

Colorist: In textile coloration, a person experienced in developing color formulas, evaluating samples for color and producing colored samples to meet standards.

Color index (CI): A listing of dyes and chemical structures published by the Society of Dyers and Colorists. Each structure is assigned a name according to chemical composition. Each dye is assigned a number according to its class and shade. A correlating

structure number is given when available.

Color Temperature: Hues on the color wheel located closer to orange are warm colors; those closer to blue are cool colors.

Compatibility: In textile dyeing, propensity of individual dye components in a combination shade to exhaust at similar rates resulting in a buildup of shade that is constant, or nearly constant, in hue throughout the dyeing process.

Copper chelating value (CuCV): The milligrams of copper sulfate pentahydrate chelated by one gram of a chelating agent or product containing a chelating agent.

Crocking: Crocking refers to blue indigo dye that comes off during spinning or knitting. Indigo in this state cannot stain anything washable like skin or clothing. It may stain wood or bamboo needles, as they are porous and not usually washable. Crocking will cease after a few washings.

Cross dyeing: A process of dyeing textiles containing fibers having different dye affinities to achieve a multicolored effect.

Depth of Shade (DOS): a percentage describing the amount of dye used proportional to the dry fiber weight, or OWOG. To dye 100 grams of fiber to a 1% DOS, your dye powder would weigh 1% of 100 grams, or 1 gram.

Desizing: The process removal of size materials from greige (gray) fabric to prepare for dyeing.

Detergent: A detergent is a compound or a mixture of compounds, intended to assist cleaning & acts mainly on the oily films that trap dirt particles.

Dip: Immersion of a textile material in some processing liquid. The term is usually used in connection with a padding or slashing process.

Direct dyes: A class of dyestuffs that are applied directly to the substrate in a neutral or alkaline bath. They produce full shades on cotton and linen without mordanting and can also be applied to rayon, silk and wool. Direct dyes give bright shades but exhibit poor washfastness.

Disperse dyes: A class of water-insoluble or slightly

soluble dyes originally introduced for dyeing cellulose acetate and usually applied from fine aqueous suspensions. Disperse dyes are widely used for dyeing most of the manufactured fibers.

Dyes/dyestuff: Substances that add color to textiles. They are incorporated into the fiber by chemical reaction, absorption, or dispersion. Dyes may be divided into natural and synthetic types. Natural dyes are extracted from root bark, flowers and marine growth. Synthetic dyes are chemically compounded through many processes from coal tar or other sources of hydrocarbon molecules. On basis of application it is classified as Acid dye, Azoic dye, Basic dye, Direct dye, Disperse dye, Mordant dye, Reactive dye, Sulphur dye, Vat dye etc. Fluorescent whitening agent is also a dye.

Dyeing: A process of coloring fibers, yarns, fabrics or garments with either natural or synthetic dyes under specified conditions.

Dyeing auxiliaries: Various substances that can be added to the dyebath to aid dyeing. They may necessary to transfer the dye from the bath to the fiber or they may provide improvements in leveling, penetration etc.

Also call dyeing assistants.

Dye liquor: The liquid that contains the dye and the reagents necessary for dyeing.

Ecmc: In color difference evaluation, a single number defining the total color difference in CMC units of a trial from a standard.

Emulsion: A suspension of finely divided liquid droplets in a second liquid, i,e., oil in water or vice versa.

Exhaustion: During wet processing, the ratio at any time between the amount of dye or substance taken up by the substrate and the amount originally available.

Fast or Fastness: A fast color will not fade due to exposure to light or washing.

Fixation: The process of setting a dye after dyeing of printing, usually by steaming or other heart treatment.

Fluorescent: A substance that is added to a textile (uncolored or colored) to increase the apparent light reflectance in the visible region by the conversion of

ultraviolet radiation into visible light and so to increase the apparent brightness or whiteness of the textile. Similar words brightener.

Florescent whitening agent (FWA): Colorant that absorbs near ultraviolet (UV) radiation and re-emits visible (violet-blue) radiation. This causes a yellowish material to which it has been applied to appear whiter.

Foam: Dispersion of gas in a liquid or solid. The gas bubbles may be any size. The term covers a wide range of useful products such as insulating foam, cushions, etc. It also describes the undesirable froth in polymer melts, dye baths, etc.

Foam Finishing: The application of one or more liquid chemicals finishes in the form of a foam to a textile material with the advantage of low wet pick-up

Hard water: Water described as "hard" is high in dissolved minerals, specifically aclcium and magnesium. Hard water is not a health risk, but a nuisance because of mineral buildup on fixtures and poor soap and/or detergent performance.

Heat setting: Heat-setting is a heat treatment by which

shape retention, crease resistance, resilience and elasticity are imparted to the fibres. It also brings changes in strength, stretchability, softness, dyeability and sometimes on the color of the material. All these changes are connected with the structural and chemical modifications occurring in the fibre.

Hue: The attribute of color perception by means of which an object is judged to be red, orange, yellow, green, blue, violet or a combination of these.

Hydrolysis: A double decomposition reaction involving the addition of the elements of water and the formation of an acid and a base, an acid and an alcohol, or an acid and phenol.

Hydrophilic: Having strong affinity for or the ability to absorb water.

Hydrophobic: Lacking affinity for or the ability to absorb water.

Indigo: Originally a natural blue vat dye extracted from plants, especially the indigofera tinctoria plant. Most indigo dyes today are synthetic. They are frequently used on dungarees and denims.

Ingrain dye: A colorant, which is formed, in situ, in the substrate by the development and coupling of one more intermediate compounds. The terwas originally used for colorants obtained from oxidation bases and by azoic techniques, but is now reserved for other types of colorant formed in situ.

Inhibitor: A substance that retards or prevents a chemical or physical change. In textiles, a chemical agent that is added to prevent fading, degradation, or other undesirable effects.

Isoelectric: Same charge in a certain condition. When positive and negative charges are equal. The isoelectric point is pH value at which the molecule carries no electrical charge or the negative and positive charges are equal.

Isotherm: Constant temperature line used on graphs of climatic conditions or thermodynamic relations, such as pressure-volume relations at constant temperature.

Jet dyeing machine: A high-temperature piecedyeing machine that circulates the dye liquor through a Venturi jet, thus imparting a driving force to move the fabric. The

fabric, in rope form, is sewn together to form a loop.

Kier: A large metal tank, capable to being heated uniformly, used for wet processing.

Kier boiling: Process of boiling cellulosic materials in alkaline liquors in a kier at or above atmospheric pressure.

Laboratory sample: A portion of material taken to represent the lot sample, or the original material and used in the laboratory as a source of test specimens.

Leuco dye: A soluble, reduced form of a dye from which the original dye may be regenerated by oxidation.

Liquor ratio: In wet processing the ratio of the weight of liquid used to the weight of goods treated.

Lot: A unit of production or a group of other units or packages that is taken for sampling or statistical examination, having one or more common properties and being readily separable from other similar units.

Metal-complex dye: A dye having a coordinated metal

atom in its molecule. Unless the term metal-complex dye is used in direct association with a particular application class of dye, e.g. metal-complex disperse dye or metal-complex reactive dye, its use is inexact and inadvisable.

Migration: Movement of an added substance (e.g. dye or alkali) from one area to textiles to another. Commonly used to express the movement of color from the dyed area to the undyed area of cloth.

Mock Dyeing: A heat stabilization process for yarns. The yarns are wound onto packages and subjected to package dyeing conditions (water, pressure, temperature) but without dye an chemicals in the bath.

Mordant: A chemical used in some textile fibers to provide affinity for dyes. Or a substance, usually a metallic compound, applied to a substrate to form with a dye a complex which is retained by the substrate more firmly than the dye itself.

Mordant dye: A dye that is fixed with a suitable mordant.

Natural Dyes: Dyes made from natural substances, usually from the bark, leaves, roots, flowers, or wood of a plant. There are also insects, notably cochineal and lac, that make dyes.

Optical Brightener: A colorless compounds that, when applied to fabric, absorbs the ultraviolet radiation in light but emits radiation in the visible spectrum.

Over Dye: When one dye is dyed over another. Indigo is often used as an over dye. This term is sometimes used for dyeing over naturally colored fibers.

OWB: On the weight of bath.

OWF: On the weight of fabric/fibre

OWG: On the weight of goods.

OWV: On the weight of value.

Pad: A machine for impregnating fabrics with chemicals. It consists essentially of a trough followed by two or more pairs of squeeze rolls.

pH: Value indicating the acidity or alkalinity of a

material. It is the negative logarithm of the effective hydrogen ion concentration. A pH of 7.0 is neutral; less than 7.0 is acidic; and more than 7.0 is basic.

Pick-up: % or weight added per unit weight of fabric.

Pigment: A substance consisting of small particles that is insoluble in the applied medium & is used primarily for its coloring properties.

Pigment printing: In pigment printing insoluble pigments which have no affinity for the fibres are fixed on the textiles with binding agent in the pattern required.

Premetallized acid dye: An acid dye manufactured by reacting an equivalent of a suitable metal ion with one equivalent of a dye, or with two equivalents of the same or different dyes, capable of chelating the metal.

Preparation: In textile manufacturing, those processing operations performed on greige fabric, colored fabric, textile yarns or fibers to ready them for dyeing, printing or finishing. For example, typical greige cotton fabric preparation includes singeing, desizing, scouring, bleaching and (optionally) mercerizing.

Reactive dye: A dye that, under suitable conditions, is capable of reacting chemically with a substrate to form a covalent dye-substrate linkage.

Reduction clearing (RC): The removals of unabsorbed disperse dye from the surface of polyester at the end of the dyeing or printing process by treatment in a sodium hydroxide/sodium hydrosulfite bath. A surface-active agent may be employed in the process.

Retarder (Retardants): A chemical that, when added to the dyebath, decreases the rate of dyeing but does not affect the final exhaustion.

Saponification: Specifically in relation to manufactured fibers, saponification is the process of removing part or all of the groups from acetate or triacetate fiber, leaving regenerated cellulose.

Saturation: The maximum intensity or purity of a color. If the color is as brilliant as possible, it is at saturation; if the color is subdued or grayed, it is dull, weak, and low in intensity.

Scouring: In textile processing, treatment of textile materials in aqueous or other solutions to remove nature

fats, waxes, proteins and other constituents as well as dirt, oil and other impurities.

Shade: A common term loosely used to describe broadly a particular color or depth, e.g. pale shade, 2% shade, mode shade, fashion shade.

Shading: In colored textile fabrics, gradual changes in hue, chroma and/or lightness lengthwise or widthwise. When unintended, shading is considered a defect; may be international for styling purposes.

Sizing: A generic term for compounds that are applied to warp yarn to bind the fiber together and stiffen the yarn to provide abrasion resistance during weaving, Starch, gelatin, oil, wax and manufactured polymers such as polyvinyl alcohol, polystyrene, polyacrylic acid, and polyacetates are employed.

Soap: Soap is a metallic salt of saturated or unsaturated higher fatty acid. There may be pb, Mg, Ca or other metallic salts.

Softener:

1. A product designed to impart a soft mellowness to the fabric. Examples are glucose, glycerine, tallow, or any one of a number of quaternary ammonium compounds.
2. A substance that reduces the hardness of water by removing or sequestering the calcium and magnesium ions.
3. A substance used to reduce friction during mixing and processing when dry powders are added to polymers.

Solubilized sulfur dye: A thiosulfuric acid derivative of a sulfur dye which during dyeing is converted to the substantive alkali-soluble thiol form.

Solubilized vat dye: A water-soluble salt of the sulfuric ester of a leuco vat dye. After application to the fiber the parent vat dye is regenerated by hydrolysis and oxidation.

Solvent dye: A dye which is soluble in organic solvents, but not in water, and is widely used in lacquers, inks, waxes, plastics, soaps, cosmetics, fuels and colored smokes.

Solvent Dyeing: The use of solvents as dye bath media instead of water becomes quite a popular concept, where solvent carries the dye molecules to the interior of fibre & then recovered. Introduction of Hydrophobic fibres like cellulose acetate has pronounced dyeing problem as no

synthetic & natural dye at that time , are capable of dye it.

Souring: Any treatment of textile materials in dilute acid. Its purpose is the neutralization of any alkali that is present.

Space Dyeing: The process of applying multiple dyes to damp fiber then heat setting it, usually by steaming or baking. Brushes can be used, but tools for pouring or squirting are often more effective.

Substantivity: The attraction, under the precise conditions of test, between a substrate and a dye (or other substance) where the latter is selectively extracted from the application medium by the substrate.

Substrate:

1. In textiles, a fiber, fiber assembly, yarn, fabric or garment to which another material is applied.
2. Fabric to which coatings or other fabrics are applied. It can be of woven, knit, nonwovens, or weft-insertion construction. Generally, substrate properties are dependent both on fiber type and fabric construction. Usually the fabric is scoured, heat-set and otherwise finished prior to coating or bonding. Many smooth-surfaced manufactured fiber fabrics require

impregnation with a latex prior to coating to ensure adequate adhesion.

Sulfur dye: A dye, containing sulfur both as an integral part of the chromophore and in attached polysulfide chains, normally applied in the alkali-soluble reduced (leuco) form from a sodium sulfide solution and subsequently oxidized to the insoluble form in the fiber.

Surfactant: An agent, soluble or dispersible in a liquid, which decreases the surface tension of the liquid contraction of “surface active agent”

Thickener: Thickener is a thick mass which impart stickiness & plasticity to the printing paste so that it may be applied on the fabric surface without bleeding or spreading & be capable of maintaining the design outline.

Uneven dyeing: A fabric dyeing that shows variations in shade resulting from incorrect processing or dyeing methods or from use of faulty materials.

Union dyeing: A process of dyeing textiles containing fibers having different dye affinities to achieve the appearance of a uniform, homogenous color.

Unlevelness: In textile dyeing and finishing, non-uniform

distribution of a dye or chemical in or on a substrate.

Vat dyes: A water-insoluble dye, usually containing keto groups, which is normally, applied to the fiber from an alkaline aqueous solution of the reduced enol (Leuco) form which is subsequently oxidized in the fiber to the insoluble form.

Wash fastness: A measure of resistance to fading by laundering. Different dye types are measured at different temperatures. Wash Fast/Jacquard brand dyes are rated at 105F°, while more washfast dyes types like Lanaset/Sabraset are rated at 140F°.

Wet pick-up: In textile processing, the amount of liquid, and material carried by the liquid, applied to a textile. Wet pick-up is usually determined as a percentage of either the dry or conditioned weight of the textile prior to processing.

Wetting agent: It is a chemical substance that increases the spreading & penetrating properties of a liquid by lowering its surface tension that is the tendency of its molecules to adhere to each other.

What is stain resistance finish: It is the finish to prevent

water & or oils from penetrating the fabric using potential aqueous & oily stain to bead up & roll off.

What is soil release finish: Soil release is the term used to describe clean ability of fabrics by the laundering process.

What is antimicrobial finished: **Antimicrobial finish** is one kind of chemical finish which is improve fabric durability on various substrates, impact on people & their environment, they interact with good & bad microorganism.

What is textile finishing: Finishing has been defined by textile instate as “Descriptive of processes, physical or chemical, applied to a substrate to produce a desired effect”. It is chemical or mechanical treatments performed on fibre, yarn or fabric to improve appearance, texture, or performance.

What is Calender: A machine in which heavy roller rotates in contact under presser, used to smooth & flatten fabric to close the intersections between the yarns & to confer a surface glaze.

What do you mean by DP & Curing: DP means

Durable Press OR Permanent press, it is a finishing treatment designed to impart to a textile material or garments the retention of specific contours including defined creases & pleats resistant to normal usage, washing or dry.

Curing is a process following application of a finish to textile fabrics in which appropriate conditions are used to effect a chemical reaction.

Why foam is used?: In wet processing technology cost is very high mainly due to high consumption of energy which itself is the result of high consumption of water. The idea of replacing water in the use of foam reduces the total processing cost by reducing these costs- 1. Heating cost. 2. Effluent treatment cost. 3. Chemical & dye stuff cost

Wet pick-up: The weight of liquor taken up by a given weight of the fabric after impregnation, spraying, or coating element.

Wicking: The passage of liquids along or through a textile material or along the interstices formed by textile element & coating polymer of a coated fabrics.

Wrinkle recovery/resistance: A laboratory test to measure angle (degrees) of recovery from wrinkling or creasing.