OHIO SCHOOL DESIGN MANUAL
Ohio School Facilities Commission
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A. COLOR IN SCHOOLS

1. Although color can be one of the most influential elements in the design of an educational facility, it is often not given appropriate attention in the design process, but rather develops as a result of product availability, color trends, ease of maintenance, or personal subjective preference of those involved in selecting colors instead of more scientific principles. The appropriate use of color is important in protecting eyesight and eyestrain, thereby creating surroundings that provide a balance of stimulation and a sense of security.

2. While developing standard palettes of colors for all schools would not be practical or beneficial, there are guidelines that can be used for the use of color and light in K-12 environments.

3. The reaction to, and influence of, color differs with variance in age groups. Children will, to some extent, view color differently than adults. Their eye and brain development is at a different stage than adults and at younger ages, they have not been as influenced by marketing trends. Different age groups in K-12 schools will vary in response to color as well.

B. RECOMMENDATIONS FOR COLOR APPROACH FOR ELEMENTARY SCHOOLS

1. Environments of a color palette made completely of neutral colors (achromatic hues) such as blacks, whites, greys, even dark browns, and off whites should be avoided. Lack of light wavelengths (colors of a variety of hues) have been shown to increase nervousness, anxiety, and insecurity in Dr. Harry Wohlfarth's, "*Effects of Color and Light on the Development of Elementary School Pupils,*" twelve month study from 1982-1983. These colors have been shown to be rejected or disliked by children ages 5-12 by Heinrich Friely's, Institute of Color Psychology, "*Study of Children's Color Preferences all Over the World."*

2. Warm base, background colors such as light salmon, beiges, soft yellows, or peaches on the walls have a tendency to complement the extroverted nature of younger children thus reducing tension, nervousness, and anxiety. Accent colors of more saturated hues of all colors will provide a moderate amount of stimulation as well as providing eye muscle relief to the warm lighter walls according to Frank A. Mahnke, Founder and Director of the American Information Center for Color and Environment.

B. RECOMMENDATIONS FOR COLOR APPROACH FOR ELEMENTARY SCHOOLS (cont.)

3. Avoid overuse of deeply saturated bright hues on all architectural elements (walls, floors, ceilings, and bulkheads) as this will create too much stimulation and children will have a hard time focusing.

4. Humans, especially children, can relate to the visual stimulus of color as an indication of location or special relationship. Color, therefore, provides an excellent element for Away finding≅ in a building. Areas of the building can be identified by use of colors on certain interior elements. Different corridors, classroom pods, clusters, or wings of a building could be color-coded to help children develop a sense of location in a large school. Note that the entire space in an area should not become one color (walls, lockers, flooring, casework) but rather, use one or two elements such as tack boards, signage, an occasional floor tile as a color accent that is consistent in each area of the building. When asked their preference, children ages 5-12 preferred and related to primary and secondary colors such as yellow, red, blue, violet, orange, and green (Heinrich Friely, Institute of Color Psychology, "S*tudy of 10,000 Children's Color Preferences all Over the World").*

5. As age increases, preferences are developed for more tertiary colors, in shades and tones of the primary and secondary color group.

6. As adults create environments for children, we should not allow our preferences to avoid the use of these preferred colors as accents and focal points throughout schools for an elementary school.

C. RECOMMENDATIONS FOR COLOR APPROACH FOR UPPER GRADES AND SECONDARY SCHOOLS

1. Many of the recommendations suggested for elementary grades are applicable.

2. Avoid a palette of achromatic hues.

3. Warm base colors (beige, light yellows, taupes, and peaches) on the walls will make one feel warmer than the actual temperature. This may be very beneficial in those schools in northern Ohio. Lighter shades of blue and green have been shown to elicit a sense of calmness, thus providing an environment conducive to concentration. These colors could probably be more applicable in classrooms and in the media center.

4. "Softer surroundings created by subtle and/or cooler hues have centripetal action which enhances the ability to concentrate. Beige, pale or light green, and blue-green are appropriate and they permit better concentration by providing a passive effect," according to Frank H. Mahuke's, "*Color, Environment and Human Response."*

5. If a wall in a space is indicated as the primary teaching wall or focus of presentation, a darker hue of a color on the wall will pull one's attention toward that wall.

6. School colors should be considered and discussed as to how and whether they should be incorporated into the overall color scheme. School colors are usually used in the athletic areas. Locker specifications should include the school color for the finish.

D. GENERAL RECOMMENDATIONS

1. Carpet

   a. A multicolor, dark carpet will hide staining and soiling.

   b. The value of a carpet should be at least as dark as value #6 on a grey scale.

2. Grout color for floor tile should always be a tinted shade (never white, light grey, or cream) to avoid staining and discoloration. Dark colors value #6 and above a grey scale work best.

3. Performance Stages

   a. Back walls and side walls of a stage are usually painted black or dark grey unless the space is multiuse.

   b. Stage floors are usually a dull, dark stain, or black to avoid the reflection of stage lighting.

4. Visual Display Boards

   a. The contrast of the background of a wall writing surface and the color of the written message should be as great as possible.

   b. Markers will be viewed best on a white marker board.

   c. All visual display boards should be glare-resistant.

5. Computer Area recommendations from the American Optometric Society for rooms with computers

   a. Wall color light reflectance: 50% - 60%

   b. Floors: 20% - 30%

   c. Furniture: 30% - 50%

   The goal is to have a 3:1 ratio between contrasts of surfaces in this type of space.

D. GENERAL RECOMMENDATIONS (cont.)

6. Work Surfaces

   a. The color and value of a work surface should contrast slightly to a piece of paper or a book, but should not be too dark to create an extreme contrast which would pull the attention away from the book or paper.

7. Plastic laminate on counter tops and work surfaces should have a pattern to them to avoid constant fingerprint marks.

8. Photometrics, to determine light levels, should be completed after a general color palette, hues, and color values of materials have been established for the building. Different colors and values of color will have different light reflectance and will affect the light footcandles required for each space.

9. The use of repeated colors and materials such as a common wall paint and flooring material will help give the building some unity and a sense of consistency, as well as giving each area a feeling of extended space.

E. EXTERIOR

1. The exterior palette is usually developed as a reflection of the surrounding environment relating to neighborhood buildings and landscape.

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A. LOOSE FURNISHINGS/EQUIPMENT

1. Loose furnishings and equipment in the project are those items that are not attached to the building such as furniture, special subject equipment, appliances, trash receptacles, cleaning equipment, etc. The type of loose furnishings and equipment for a school should be selected to support the educational curriculum and the function of the spaces, but also provide flexibility for change and development in the future. The exact items and styles may vary from school to school.

2. The recommended furniture and equipment is identified on each space plate in chapters 4, 5 and 6. Following are guidelines for a level of quality, durability, and function for various types of furniture that may be used in a school as well as features for consideration and review with school district representatives.

3 Maintenance items such as sweepers, lawn care machines, mops, brooms, buffers, scissors hoist, etc., are funded by the school district.

4. Student tables, student desks, and student chairs must comply with The Consumer Product Safety Improvement Act (CPSIA) of 2008 which regulates testing requirements for children's products. Section 102 of CPSIA provides regulations for lead in paint and similar surface coatings. Upon request, manufacturers must submit a third party testing and certification complying with Section 102 of the CPSIA with the requested bid.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS

1. Student Tables
   a. Tops
      .1 1 inch to 1 1/4 inch plywood with patterned horizontal grade plastic laminate on top and exposed, sanded, sealed, and lacquered plywood edge. Include steel stretcher support bar on tables over 60 inches in length.

   b. Legs or T Bases
      .1 19-gauge steel tubing with self-adjusting, rubber-cushioned, swivel type, nonremovable glides. Nickel plated chrome or electrostatically applied epoxy powder coat finish. Adjustable legs for flexibility for elementary schools and middle schools are beneficial to accommodate a wide range of student sizes at a given grade level. Tables 29 inches high are a standard height for adults and meet the Americans with Disabilities Act guidelines.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS (cont.)

2. Student Desks
   a. Styles and sizes vary. Both present and future activities and goals should be considered when selecting the type of desk. If combination and attaching chair units are purchased, some free stand desks without chairs meeting the Americans with Disabilities guidelines should also be purchased.

   b. Tops
      .1 For ease of maintenance and durability, it is recommended that tops be 5/8 inches to 3/4 inches solid molded, thermosetting plastic with rounded edges.

   c. Frames
      .1 Nickel chrome plated or electrostatically applied epoxy powder coat finish shall be used. Construction will vary with style of desk. A minimum of 18-gauge should be used for legs and a minimum of 16-gauge steel tubing used for horizontal support and bracing. All welds should be continuous.

   d. Glides
      .1 Super-silent, rubber-cushioned, swivel-type, nickel plated steel should be externally applied and crimped onto legs. Glides should be nonremovable.

3. Student Chairs
   a. Two different types of student chairs are typically used in schools. One is a soft plastic, molded steel chair, and the other type is a hard solid, molded thermosetting, plastic independent seat and back support. Both are valid options for classroom seating. The soft plastic chairs are usually available in either a four leg with glide or a sled base style. The hard plastic chairs are usually available only in a four leg with glide option.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS (cont.)

b. Sled base style chairs are generally used in carpeted areas, but, if a glide is placed on the bottom of the sled base, it can also be used on a resilient floor. The four leg chair option is generally used for resilient floors, but can also be used in carpeted spaces. The concern with a four leg chair is that the glides do sometimes come off the legs, even when crimped on in a permanent mounting. The exposed leg of the chair can then cause damage to both a carpeted or resilient floor.

c. Soft plastic chairs provide a softer and more comfortable seat. They, generally, are less expensive.

d. The hard plastic chairs are much heavier, are easier to keep clean, and are more durable with a longer use life than soft plastic. Both styles of chairs only stack about 5 to 7 chairs high.

e. Frames

.1 Nickel chrome plated or electrostatically applied epoxy powder coat finish shall be used. Nickel/chrome finish must meet all requirements for nonpeeling and abrasion-resistant finish. A minimum of 18-gauge steel tubing for legs and 16-gauge 1 1/8 inch steel tubing for backs should be used to construct the frame.

.2 Solid plastic chairs should have an "H" style frame for the legs. Avoid using an "A" style leg base. Cross-bracing of the legs about 9 inches to 12 inches below the seat is recommended for support. All welds should be continuous.

f. Solid Plastic Seat and Back

.1 Seat back should be a minimum of 5/8 inch solid, molded thermosetting plastic with contoured edges. Seat and back should be attached with metal to plastic fasteners from the frame or with exposed rivets so the exposed seating surfaces of plastic units are left unbroken.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS (cont.)

g. Soft Plastic Shell Seat

.1 Shell shall be one piece, flexible injection, molded shell with support ribbing. Shell should be attached with metal to plastic fasteners from the frame in such a way that the exposed seating surface is left unbroken and fasteners should not penetrate front of shell.

.2 Seat shall be braced in such a way that visible "stress" marks do not occur.

h. Glides

.1 ***Swivel-type, nickel-plated, steel glides*** should be externally applied and crimped onto legs. Glides should be nonremovable.

i. Sizes

.1 Exact sizes vary from manufacturer to manufacturer ranging from 12 inches to 18 inches in seat height. The following are some general guidelines for grade levels; however, Owner representatives should verify exact sizes and ratio depending on their own school requirements and need for flexibility.

Kindergarten and Prekindergarten 12 inches to 13 1/2 inches:

Grade 1	12"	to	14"
Grade 2	13 1/2"	to	15"
Grade 3	14"	to	15"
Grade 4	15"	to	16"
Grade 5	15"	to	16"
Grade 6	16"	to	18"
Grades 7 to 12	17 1/2"	to	18"

4. Teacher Desk

a. Teacher/staff desks may vary in size and style. Depending on teaching styles and methods of different school districts, the option to use something more mobile and flexible, such as a teacher support cart with writing area or a work surface on casters with hanging storage drawers versus an actual desk, may be considered.

.1 Regardless of the actual style of this desk/work surface or cart, the unit should have the capacity to hold supplies and a computer. Lockable drawers or storage is beneficial.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS (cont.)

b. Desk Construction
.1 22-gauge steel, reinforced, double wall, end panel or 20-gauge steel modesty panel or steel pedestal supported desks with steel or 1 inch horizontal grade plastic laminated 4 1/2 pound per linear inch honeycomb core. Front and back edges of top are to have post formed curved contour.

c. Work Surface Construction
.1 The frame is to be seam welded 16-gauge steel outer leg with 14-gauge steel tubing inner leg/support. Formed steel (11-gauge) cross support channel 1/4 inch thick steel work surface mounting plates or support arms or 14-gauge steel tubing support arms. All welds are to be continuous. Cable and cord raceway integral with frame construction. Top surface is to be horizontal grade plastic laminated 1 inch to 1 1/4 inch thick high density particle board with melamine/phenolic backing sheet. Front and back edges are to be post curved contour.

d. Glides
.1 Nickel/chrome plated steel self-leveling units.

e. Drawer Construction
.1 22-gauge steel durable wall box construction with 18-gauge steel ball bearing full extension glides or nylon roller suspension. Integral shaped pull in steel front. File drawers are to include integral hanging file lip on side of drawer and spring loaded follower.

f. Finish
.1 Nonchipping enamel or epoxy powder coat, electrostatically applied and then baked on over a rustproofing primer.

g. Details
.1 Plastic grommets with snap fit covers in top, wire management under unit, locks on drawers, end panel cable pass through is advantageous.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS (cont.)

5. Vertical Files
   a. Space considerations, location, layout, and type of filing should be reviewed before determining type of file and drawer capacity required. Vertical files are available in both letter and legal size.

   b. Shell Construction
      .1 22-gauge cold rolled, steel for all vertical surfaces and 20-gauge steel for top and bottom.

   c. Drawer Construction
      .1 22-gauge, cold rolled, steel with high drawer sides to form integral lip for hanging files. Drawer should include spring-loaded 22-gauge steel follower back with positive locking action.

   d. Drawer Suspension
      .1 Full extension of triple tier assembly with a minimum of 116 steel ball bearings.

   e. Details
      .1 Interchangeable core, removable locks, counterweight to inhibit tipping. Mechanical interlock preventing extension of more than one drawer at a time.

   f. Warranty
      .1 15 years

6. Lateral File
   a. Space considerations, location, layout, and type of filing should be reviewed before determining the type of file and drawer quantity required. Lateral files can be used to file paper both from front to back and side to side. Most lateral files are sized to fit both letter and legal paper but others are sized only for letter filing side to side.

   b. Shell construction
      .1 A minimum of 20-gauge steel sides and double wall base and back and 18-gauge steel top and bottom with double wall base.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS (cont.)

c. Drawer construction
.1 A minimum of 20-gauge cold rolled steel front with high sides. Removable front to back filing handrail bars to permit side to side filing.

d. Finish
.1 Chip resistant enamel electrostatically applied and then baked over a rustproofing primer.

e. Drawer suspension
.1 Full extension of triple tier assembly with a minimum of 40 steel ball bearings.

f. Details
.1 Locks are too be interchangeable and core removable. Center weight to inhibit tipping. Mechanical interlock preventing extension of more than one drawer at a time.

g. Warranty
.1 15 years

7. Steel Bookcases
a. Bookcases range from 2 to 5 shelves and usually 12 inches to 14 inches deep. Units over 36 inches should be placed against wall because they will easily tip over.

b. Shell construction
.1 20-gauge, cold rolled, steel sides and back with double wall box base. Integral standards to accept shelf supports for adjustment of 1/2 inch increments.

c. Shelves
.1 18-gauge, cold rolled, steel to accept loads of up to 100 pounds.

d. Finish
.1 Chip-resistant enamel electrostatically applied and baked over a rustproofing primer.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS (cont.)

8. High Density Stack Chair
   a. High-density stack chairs provide flexibility in many spaces. Chairs should be comfortable with seat and back contours to give user back support. Chairs vary with stacking ability depending on design. ***Chairs should stack no higher than 60" above the floor.***

   b. Frame
      .1 7/16 inch diameter, solid coil, wire bent, sled base frame with maximum of 8 welded points on frame. Avoid cold welds.
      .2 Frame to include 7/16 inch solid wire seat brace. Frame finish to be either nickel chrome plate or electrostatically applied epoxy powder coat.

   c. Seat and Back
      .1 Two-piece, independently molded seat and back. Seat and back construction should be in-through color injection, molded thermoset plastic. Attach to frame with plastic to metal fasteners. Seat and back should be replaceable.

9. General
   a. Manufacturers shall provide the standard product warranty, unless otherwise noted by the Design Professional.

   b. Adjustable, pneumatic chairs should have a minimum replacement warranty of 5 years for the hydraulic lift mechanism.

   c. Fabrics on seating being used by students should have a durability exceeding 50,000 double rubs and meet state and local fire codes. Fabric is to pass ASTM-E84 and NFPA-255 codes. Color fastness is to meet 40-hour NAFM requirements.

   d. Fabrics on seating being used in the administrative, guidance, or other private staff areas should have a durability of exceeding 30,000 double rubs and meet state and local fire codes. Fabric is to pass ASTM-E84, and NFPA-255 codes. Color fastness is to meet 40-hour NAFM requirements.

B. QUALITY GUIDELINES AND FURNITURE SELECTION CONSIDERATIONS (cont.)

e. Folding cafeteria tables on wheels should have pneumatic cylinders lift assist mechanism and an automatic lock with 2 manual releases in the folded and unfolded position.

f. All furniture is to meet the Americans with Disabilities Act guidelines.

g. Horizontal grade, plastic laminate tops on table, desk, work surface, and file tops is recommended for cleaning and durability.

LESSONS LEARNED

1. ***Many sled-based student chairs are now available with non-skid glides appropriate for hard-surface floors. Sled-based cantilever chairs are more ergonomic, but it is important to evaluate the glide as some can damage the floor.***

2. ***Steel glides are generally considered preferable over nylon glides on hard surfaces because although they do cause black marks on the floor, they are less likely than plastic to scratch the floors over time. Steel guides must be specified, if desired, since most manufacturers have nylon as a standard.***

3. ***Some manufacturers offer a non-skid, highly durable, plastic glide that will not mar or damage floors. However, it is typically more expensive and it is important that the Owner understands that the chair will not slide on the floor.***

4. ***There are also various felt-type glides that can be field installed. These are a good solution to preventing scratches on the floor as long as the Owner understands that they will wear down and need replaced periodically.***

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A. FOOD SERVICE EQUIPMENT

The food service area displayed on the space plates shows relationships and sizes of various areas. Each school district prepares the food to be served differently, primarily because of the way food goods are purchased. The following is a list of the different types of equipment found in food service areas:

1. E-FS-1a Preparation Area
   a. Food Preparation
      - .1 Vegetable preparation sink
      - .2 Disposer with pre-rinse
      - .3 Food processor
      - .4 Mixer
      - .5 Drain trough
      - .6 Water station
      - .7 Can opener
      - .8 Scales
      - .9 Utility cart
      - .10 Mobile utility bins
      - .11 Mobile salad/dessert rack
      - .12 Refrigerator
      - .13 Freezer
      - .14 Soap dispenser
      - .15 Paper towel dispenser
      - .16 Mobile shelf truck
      - .17 Knife rack
      - .18 Mobile trash container
      - .19 Mobile and fixed work table
      - .20 Food slicer
      - .21 Ice maker

A. FOOD SERVICE EQUIPMENT (cont.)

b. Hot Food Production

.1 Cooks table with sink
.2 Pan storage unit
.3 Utensil rack
.4 Scales
.5 Can opener
.6 Mixer
.7 Fire suppression system
.8 Range
.9 Grill
.10 Oil filter/pump
.11 Hotplate
.12 Steam cooker
.13 Oven
.14 Kettle
.15 Tilt skillet
.16 Drain trough
.17 Water station
.18 Utility raceway
.19 Utility cart
.20 Mobile pan/cooling rack
.21 Mobile ingredient bin
.22 Refrigerator
.23 Freezer

A. FOOD SERVICE EQUIPMENT (cont.)

c. Baking
- .1 Refrigerator
- .2 Freezer
- .3 Oven
- .4 Proofing cabinet
- .5 Range
- .6 Trunnion kettle and stand
- .7 Fire suppression system
- .8 Sheerer
- .9 Water station
- .10 Mixer
- .11 Bakers table
- .12 Dessert table
- .13 Bakers sink
- .14 Mobile bakers rack
- .15 Pan storage unit
- .16 Pan dolly
- .17 Scales
- .18 Utility cart
- .19 Soap dispenser
- .20 Paper towel dispenser

d. Pot and Pan Washing
- .1 Three compartment sink
- .2 Disposer
- .3 Pre-rinse assembly
- .4 Water agitator
- .5 In-sink heater
- .6 Mechanical pot brush
- .7 Booster heater
- .8 Ventilation system - hood
- .9 Shelf truck
- .10 Utility cart
- .11 Soap dispenser
- .12 Paper towel dispenser

A. FOOD SERVICE EQUIPMENT (cont.)

2. H-FS-1b Serving Area
   - a. Tray cart
   - b. Flatware dispenser
   - c. Napkin dispenser
   - d. Straw dispenser
   - e. Milk cooler
   - f. Hot food station
   - g. Display warmers
   - h. Display refrigerators
   - i. Sandwich/fry slide
   - j. Serving counter
   - k. Cold food station
   - l. Dessert/snack station
   - m. Tray pick up station
   - n. Checker/cashier station
   - o. Ice cream cabinet
   - p. Specialty bar station
   - q. Hot food holding cabinet
   - r. Cold food holding cabinet
   - s. Mobile utility cabinet
   - t. Back counter with sink
   - u. Tray slide

3. H-FS-1c Dry Food Storage
   - a. Shelf unit
   - b. Dunnage platform
   - c. Dolly
   - d. Mobile ingredient bin
   - e. Can dispensing rack
   - f. Utility cart

4. H-FS-1d Cooler/Freezer
   - a. Mobile shelf unit
   - b. Mobile dunnage platform
   - c. Dolly
   - d. Mobile cooling rack
   - e. Strip curtain

A. FOOD SERVICE EQUIPMENT (cont.)

5. H-FS-1e Ware Washing
   - a. Soiled dish table
   - b. Clean dish table
   - c. Dishwasher
   - d. Disposer
   - e. Detergent-rinse injector
   - f. Wall shelf
   - g. Wall cabinet
   - h. Pre-rinse assembly
   - i. Rack dolly
   - j. Mobile trash container
   - k. Hose station
   - l. Tray return conveyor
   - m. Mobile bussing rack
   - n Pass through window
   - o. Tray washing racks
   - p. Flatware washing racks

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