

APPENDIX “A”

CHECK-LIST FOR SCIENCE SAFETY REQUIREMENTS

(Required Minimums for Approval by the
N.C. Board of Education)

CHECKLIST FOR SCIENCE SAFETY REQUIREMENTS

Middle and High School Science Safety Standards.

The NC State Board of Education shall approve public school plans for science facilities in middle schools and high schools to ensure safety. In addition to the following NCSBE standards, the plans shall comply with all federal, state and local requirements (e.g. Occupational Safety and Health Administration Standards, Americans with Disabilities Act, the North Carolina State Building Code, etc.). Approval of the plans is required prior to occupancy of the science classrooms. The local education agency (LEA) is responsible for training staff and maintaining the systems and equipment to ensure safety.

- (a) LEAs shall submit scaled floor plans showing that the proposed science facilities, including the required and proposed equipment and furniture, provide for adequate circulation and teaching space and are safe for instruction. Facilities of the following gross sizes, as measured from the inside face of walls, shall be presumed to meet these requirements:
 - (1) Middle School:
 - (A) Science room shall be at least 1000 square feet;
 - (B) Preparation rooms shall be at least 250 square feet;
 - (C) One larger preparation room may be provided for each grade level.
 - (2) High School:
 - (A) Physical Science room shall be at least 1200 square feet;
 - (B) Biology room shall be at least 1200 square feet;
 - (C) Physics room shall be at least 1200 square feet;
 - (D) Earth Science room shall be at least 1400 square feet;
 - (E) Chemistry room shall be at least 1500 square feet;
 - (F) Multipurpose Science room shall be at least 1500 square feet;
 - (G) Preparation room shall be at least 250 square feet;
 - (H) Chemical Storage Room shall be at least 80 square feet.
- (b) General Lab / Classroom:
 - (1) Provide student lab furniture/built-ins with acid-resistant tops and sinks to suit the curriculum / subject area. If work stations require sinks, the number of sinks shall be based on one sink per 4 students in each lab.
 - (2) Provide a teacher demonstration table in each lab and each science classroom.
 - (3) Where wall cabinets occur, they shall be located above base cabinets.
 - (4) If wall cabinets are located above a sink cabinet, the bottom of the wall cabinet must be at least 5 feet above finished floor.

- (5) Dry erase marker boards shall be provided. Chalk boards are not permitted.
- (6) Storage for students' coats and book bags in the form of lockers, open shelves with hooks or similar device shall be provided.
- (7) A manually controlled emergency exhaust system, exhausting a minimum of six air changes per hour, for each science room not dedicated to physics shall be provided.
- (8) Chemistry labs shall include work surfaces at standing height (42 inches above finished floor, except as required by the ADA.).
- * (9) Provide space between furniture, built-ins, and other objects to allow safe movement for teacher and students. Handicapped accessibility route requirements mandate a minimum of 36 inches unless a protrusion width of 24 inches or less occurs, when 32 inches is allowed.
- * (10) Provide at least one student lab work station per lab as required by the Americans with Disabilities Act (ADA).

(c) Preparation Room:

- (1) A preparation room within at least 150 ft. of Middle School science rooms shall be provided. High School preparation rooms shall be adjacent to the science rooms. High School Preparation rooms may be shared by two labs. Middle School Preparation rooms may be shared by four labs.
- (2) Doors shall be equipped with keyed locks.
- (3) Provide lip on shelf edges at least ½" in height;
- (4) If hazardous chemicals are stored in Preparation rooms, they shall be in commercial, specially designed, ventilated as required, locked hazardous chemical storage cabinets. Separate cabinets shall be labeled that contain acids, flammables and corrosives.
- (5) A continuously operating exhaust system, exhausting a minimum of six air changes per hour shall be provided.
- (6) A dishwasher, where glassware is used, that is labeled "laboratory grade" shall be provided.
- (7) Space for a refrigerator (spark-free when used for chemistry, otherwise regular refrigerator) shall be provided.
- (8) Warm water within the range specified by NC State Building Code shall be provided to the sink.

(d) Chemical Storage Room:

- (1) Access to the chemical storage room is preferred to be through the Preparation Room if adjacent, or a single chemical storage room may be provided near the science areas.
- (2) The door shall be equipped with a keyed lock and shall swing outward. Door hardware shall always allow passage from inside room.
- (3) Provide commercially available, specially designed ventilated as mfr. recommended, locked, hazardous chemical storage cabinets and labeled as such. Provide separate chemical storage units each for acids, flammables, and corrosives.

- (4) Shelves and cabinets:
 - (A) Shall be mechanically attached with bolts, screws or other devices to wall;
 - (B) Use corrosive resistant materials;
 - (C) Shelves shall be a maximum of 12-inch deep;
 - (D) Provide lip on shelf edges at least ½" in height;
 - (E) Provide positive cabinet door latches that will withstand a seismic event. Latches must be specially designed and labeled to be earthquake resistant, relying on a mechanical type securement method as opposed to a magnetic one.
- (5) Provide continuously operating exhaust system, exhausting a minimum of six air changes per hour.
- (6) Chemical Storage Room light switch shall be located outside the room and no receptacles shall be located inside of room.
- *(7) MSDS (material safety data sheets): a space shall be provided where these sheets will be displayed inside and outside this room, adjacent the door.

(f) Safety Equipment / Systems:

- (1) Fume Hoods:
 - (A) Shall be required for high school chemistry;
 - (B) No ductless hoods or hoods requiring internal filtration will be allowed;
 - (C) Each hood shall be individually exhausted directly to the outside, a minimum of 20 feet from air intakes or building openings. All ductwork shall be stainless steel;
 - (D) Hood shall be located where effectiveness will not be jeopardized due to turbulent air flow;
 - (E) Makeup air that is equivalent to exhaust air volume shall be provided;
 - (F) Each hood shall have an air flow monitoring device and an alarm;
 - (G) Fans shall be located outside the building envelope.
 - *(H) Provide spark-proof exhaust fans.
- (2) Eyewash and safety showers
 - (A) A floor drain shall be provided at each emergency shower.
 - (B) Eyewash and safety showers shall be provided in each science room not dedicated to physics.
 - (C) Provide an eyewash station in the preparation room;

- * (D) A minimum of one eyewash and one shower shall be handicap accessible;
- * (E) Each eyewash and safety shower shall be supplied with luke warm water as required in section 411 of the North Carolina State Plumbing Code;

- * (3) Provide a fire blanket and sand for metal fires in addition to building code required ABC fire extinguishers
- (4) Provide safety cabinet(s) for storage of goggles, heat and acid resistant gloves and chemical resistant aprons, etc.
- (5) All chemical storage cabinets shall be vented or not according to the cabinet manufacturers' recommendations.
- (6) If a central hazardous chemical dilution or neutralization tank is used, it shall be located outside of the building and a minimum of twenty feet away from building openings.
- (7) Provide a single emergency shut-off switch in each lab / classroom that will close valves in the gas, water source serving each particular lab / classroom and interrupt all power not serving fume hoods, exhaust systems or lighting.
- (8) Provide a permanent means of 2-way communication between each lab / classroom and the school administration staff.
- * (9) All plumbing fixtures located in the lab or preparation room where hazardous chemicals are used, shall drain through a local dilution or neutralization device or drain into a central acid waste system. Fixtures and piping upstream of dilution or neutralization devices shall be acid resistant.
- * (10) Ground Fault Interruption (GFI) protection for all outlets in the laboratory and preparation rooms shall be provided.

* (g) Exits:

- (1) If net square footage of a science classroom/lab is 1000 sq. ft. or more it shall have at least 2 exits with doors swinging in direction of exit egress. Net area is calculated by subtracting fixed equipment and fixed furniture from the total area.
- (2) Un-sprinklered buildings: emergency egress window is required (unless a door directly to exterior is provided).
 - (A) Window Requirements:
 - (i) Minimum width of opening shall be 20 inches;
 - (ii) Minimum height of opening shall be 24 inches;
 - (iii) Minimum clear opening shall be 5 square ft. for on-grade floor and 5.7 square ft. for above-grade floors;

- (iv) Height above floor to bottom of clear opening shall be a maximum of 32 inches for grades 5 and under and a maximum of 44 inches for grades 6 and above;
 - (v) Operation shall be from the inside and not require keys or tools.
- (3) Windows are recommended in science classrooms, but not required. All windowless classrooms shall contain the following specifications:
 - (A) Un-sprinklered building requirements:
 - (i) Second exit through another classroom (cannot be a storage or preparation room) directly to a separate smoke compartment with access to an exit in the other direction;
 - (ii) Compartments are separated by smoke barriers having a 1-hour fire rating with self closing or automatic closing doors;
 - (iii) Length of path shall not exceed 150 feet;
 - (iv) Each communicating door shall be identified;
 - (v) Each communicating door shall be non-locking.
 - (B) Provide clear egress pathways within the lab or classroom.

* Items marked with asterisk are building code, ADA or other state or federal requirements.
Items not so marked are policy adopted by the State Board of Education March 2010