St. Lucie PUBLIC SCHOOLS

St. Lucie Public Schools Safety Laws, Policies, and Procedures for Science K-12

Adapted from:

FLORIDA DEPARTMENT OF EDUCATION
fldoe.org

Introduction

The use of laboratory investigations has played a vital role in distinguishing science from most other disciplines encountered in the classroom. Just as scientists acquire knowledge through a process of experimentation, students learn to appreciate how this wealth of knowledge was accumulated by simulating this same investigative process.

Without the laboratory experience as an integral part of the scientific process, only facts can be memorized. A true feeling for the process is lost. It is of vital importance that a laboratory component be incorporated into the science curriculum.

Once the laboratory component has been added to a curriculum, it becomes necessary for a teacher to understand that additional safety requirements and procedures must be implemented. These additions will provide for a more safe and meaningful experience for students.

This manual was written to provide basic safety information in the science laboratory and classroom and outline a method for proper chemical storage, handling, and disposal. Particular emphasis was placed on the appropriate use of equipment and the selection of chemicals that are deemed safe to use in the K-12 academic environment.

Additional information may be found at: http://www.fldoe.org/edfacil/sc3/safetyplan.asp

The specific citations from Florida Law, State Board Rule, and other Criteria are identified here. Below each citation of law, rule, or criteria are the definitions to aid in interpretation of the citation.

For additional information on fire statutes and safety considerations for the State of Florida, a training PowerPoint presentation may be downloaded and viewed from:
http://data.fldoe.org/register/EdFacTraining/

This manual has been revised and edited by Beth Bonvie, St. Lucie Public Schools K-12 Science Curriculum Supervisor, and Valerie Gaynor, Martin County Public Schools K-12 Science Curriculum Supervisor, under the direction of Dr. J.P Keener, Director for Math, Science and STEM programs, and includes connections to the Florida Department of Education Chemical Hygiene Plan (http://www.fldoe.org/edfacil/sc3/safetyplan.asp, 2014).

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I. Legal Considerations

A. Liability, Damages, Negligence, Foreseeability and Attractive Nuisances

Who is held liable in case an accident occurs in the laboratory depends upon many factors. The purpose of this discussion is to acquaint the science teacher with three major aspects of liability and damages: negligence, foreseeability, and attractive nuisances.

Liability: An actual or potential legal obligation, duty, debt, or responsibility to another person; the obligation to compensate (cover **Damages**), in whole or in part, a person harmed by one's acts or omissions.

Damages: Money awarded in a suit or legal settlement as compensation for an injury or loss caused by a wrongful or negligent act or a breach of contract. Most often, damages are intended as compensation to an injured person for both economic and noneconomic losses, but damages occasionally include a non-compensatory award to punish intentional or wanton wrongdoing, called punitive (or exemplary) damages.

Negligence: That degree of care which an ordinarily careful and prudent person would exercise under the same or similar circumstances; a breach of the duty to act with care appropriate to the situation and the relationship of the persons, so as not to cause harm or loss.

Foreseeability: "Reasonable anticipation" that a particular event might occur (e.g. an unpolished piece of glass tubing has the potential to cut a student). The type of activity and the circumstances under which it is done will ultimately determine whether negligence and foreseeability were present and applicable to the science teacher.

Attractive nuisance: An attractive nuisance is any inherently hazardous object or condition of property that can be expected to attract children to investigate or play (for example, laboratory equipment or unattended chemical containers). The doctrine imposes upon the teacher either the duty to take precautions that are reasonable in light of the normal behavior of young children--a much higher degree of care than required toward adults.

Many considerations play an important role in determining possible liability. The science teacher should be keenly aware of the fact that a student is a minor and legally is not bound by the same standards as is an adult. Behavior that is considered customary and usual for an adult might not be considered the same for a minor. Far more supervision and instruction is required of a teacher in a science laboratory for a child than is mandated for an adult.

Additionally, the concept of attractive nuisance comes into play far more extensively with minors. Leaving chemicals or glassware unprotected and available for students to procure is considered an attractive nuisance.

If the chemicals are in an unlocked cabinet labeled "Do Not Touch," and if a student is injured by taking some, the teacher is still liable. Those chemicals would be considered an attractive nuisance to a child and adequate precaution was not taken to prevent that child from obtaining them.

How does the science teacher insure that he/she is not liable in case an accident does occur? Of prime importance is the necessity of adequate supervision in the laboratory. Any condition that prevents adequate supervision places the teacher in a dubious situation. An overcrowded classroom is a major cause of laboratory accidents. Lack of adequate space among students, and the inability of the teacher to "see" everything that is going on, sets the stage for an accident to occur. No science facility should be expected to accommodate more students than it is designed to serve.

Instituting an adequate safety policy does not mean an accident will not occur or the teacher will not be sued. If a lawsuit is instigated and the teacher shows that adequate safety instruction and appropriate supervision was maintained, he/she will have a better chance of avoiding punitive action.

B. Determining Negligence

The legal definition of negligence is important for every teacher to know. Negligence, as defined by the courts today, is conduct that falls below a standard of care established by law or risk of harm, or the failure to exercise due care. It should be noted that in the absence of specific laws or local policies, the standard of care expected is set by the profession, e.g., position statements adopted by the National Science Teachers Associations, the American Chemical Society, the National Association of Biology Teachers, or the Council of State Science Supervisors.

The science teacher has three basic duties relating to the modern concept of negligence:

- Duty of instruction
- Duty of supervision
- Duty to properly maintain facilities and equipment

Failure to perform any duty may result in a finding that a teacher and/or administrator within a school system is/are liable for damages and a judgment and award against him/them.

C. Duty of Instruction, Supervision and Maintenance

Duty of Instruction:

Includes adequate instruction before a laboratory activity (preferably in writing) that:

- Is accurate; is appropriate to the situation, setting, and maturity of the audience and addresses reasonably foreseeable dangers.
- Identifies and clarifies any specific risk involved, explains proper procedures/techniques to be used, and presents comments concerning appropriate/inappropriate conduct in the lab.
- Reasonably addresses all foreseeable dangers inherent in any laboratory experiment or demonstration that will be performed in the science laboratory or classroom. A teacher must also instruct and ensure that students demonstrate the proper use of protective equipment.

Lesson Plans:

In the classroom, science teachers are required to incorporate health and safety as an integral part of their instruction. Ultimately, it is the teacher's responsibility to make certain that proper safety considerations have been made and that the appropriate precautions have been taken. These safety features should be reflected in the documented lesson plans.

Teachers should ask themselves the following questions before conducting every laboratory experiment:

- What are the risks associated with this activity?
- What are its worst possible outcomes?
- What do I need to do to be prepared if these outcomes should occur?
- What practices, equipment and facilities would reduce risks?
- How can I relate these hazards to dangers that my students face in their everyday lives?

Duty of Supervision:

Includes adequate supervision as defined by professional, legal and district guidelines to ensure students behave properly in light of and foreseeable dangers. Points to remember:

- Misbehavior of any type must not be tolerated.
- Failure to act on improper action is grounds for liability.
- The greater the degree of danger, the higher the level of supervision.
- The younger the age of students or the greater the degree of inclusion of special population students, the greater the level of supervision.
- Students must never be left unattended, except in an emergency where the potential harm is greater than the perceived risk to students. Even the risk should be minimized to responsibility transferred to another authorized person if the situation allows.

Duty of Maintenance:

Duty of maintenance includes insuring a safe environment for students and teachers. This requires that the teacher:

- Never use defective equipment for any reason.
- File written reports for maintenance/correction of hazardous conditions or defective equipment with responsible administrators.
- Establish regular inspection schedules and procedures for checking safety and first aid equipment.
- Follow all safety guidelines concerning proper labeling, storage and disposal of chemicals.

By keeping files of all hazard notifications and maintenance inspections, teacher liability in the event of an accident is minimized in cases where no corrective actions were subsequently made.

II. Responsibilities for Safety and Safety Contracts

The main law that affects science laboratory teachers is the Occupational Safety and Health Administration (OSHA) Laboratory Standard (29CFR1910.1450), which was initiated in 1990. The standard requires that school systems design, implement, and enforce a Chemical Hygiene Plan to insure employee safety in a hazardous environment. Although OSHA only protects employees, students usually are required to follow these standards in the science laboratory to maintain a safe environment for all.

When laboratory activities and demonstrations are made an integral part of a science curriculum, the science teacher assumes the responsibility for implementing and documenting a program of safety. It is essential that a science teacher be familiar with safety procedures and laboratory techniques when handling, storing, and disposing of chemicals. The teacher should be completely familiar with laboratory facilities so that he/she can adequately instruct students in all aspects of the aforementioned topics.

It is the added responsibility of the science teacher to insure the correct functioning of scientific equipment and laboratory facilities to prevent unwarranted accidents. To insure that students are well-trained in safety techniques and equipment usage, the teacher should utilize information in several formats. A number of video presentations are available which provide an adequate introduction to the proper handling of safety equipment, chemicals, and laboratory apparatus. Several companies also supply safety films, safety tests, and safety contracts. A student must be instructed and then assessed to insure thorough understanding of laboratory safety. Student safety performance should be monitored during every experiment and good safety procedures reinforced.

A. Administrative Responsibility

Since the ultimate responsibility for all school functions rests with the administration, liability resulting from a laboratory accident will fall under its purview. The following considerations might help to eliminate liability:

- Ensure that class sizes in science laboratories do not exceed the allowable safe maximums for space and facilities.
- Ensure that safety equipment is present and functioning properly.
- Inform all staff members of those persons trained in CPR and first aid and their location throughout the day.
- Design and implement a contingency plan for laboratory emergency situations.
- Ensure that adequate lighting for experimentation is available. Impaired vision is an invitation to accidents.
- Ensure that master shut-offs are present in every laboratory for gas, electricity, or any other service that might involve danger should an accident occur.
- Ensure that all electrical outlets are grounded and facilities are available for grounding all electrical apparatus.

- Make sure fire extinguishers are available in each science class. Fire extinguishers should be checked at least twice a year to insure proper functioning.
- Make sure that each science lab is equipped with a safety shower and eyewash that are periodically checked for proper operation.
- Make sure that there is adequate ventilation to the outside for each laboratory in which noxious fumes might be generated.

B. Teacher Responsibility

The following steps should be taken by the teacher to fulfill safety objectives:

- Make the safety program a major emphasis in the science curriculum.
- Provide a list of safety rules which must be read and signed by the student and parent or guardian.
- Show the student where the safety equipment is located, and how it works. Explain under what conditions it is to be used.
- Explain the consequences for violating safety regulations in detail.
- Instruct students in how to evacuate the lab in the proper fashion in case of emergency.
- Point out specific safety considerations in a particular experiment.
- Explain possible hazards in handling and disposing of chemicals used in an experiment.
- Never leave students alone and/or unsupervised in the lab.
- Frequently remind the students often that they are not allowed in chemical storerooms or lab preparation areas.
- Prohibit students from bringing any food or drink into the lab.
- Instruct students to never put any chemicals in their lab drawers unless told specifically to do so.
- Discuss the lab with students the day before the experiment is to be done so that safety situations and possible hazards can be clarified.
- Notify the administration, in writing, of any possible safety hazard that exists in the laboratory, especially the overcrowding of the science lab room.
- Provide only immediate care in case of an accident to prevent additional complications from arising. Contact your administration and call 911 immediately.
- Science fair projects should be scrutinized for safety hazards and corrected before teacher approval is given. Remember the science teacher is ultimately responsible for all assigned science activities.

C. Student Responsibility

Since the student is the individual most imminently involved in laboratory safety he/she should adhere to the following guidelines to minimize the possibility of a laboratory accident.

- Heed all written precautions and verbal instructions.
- Do the experimental procedure as directed.
- Do not taste, eat, smell, or touch chemicals unless specifically told to do so by your instructor.
- Wear eye protection, aprons, and closed shoes on lab days and tie long hair back.
- Notify the teacher if any hazard is present.
- Clean up your work area after each experiment.
- Know the location and proper use of safety equipment as previously taught.
- Do not wear contact lenses on days when chemical labs are performed since they may absorb chemicals and cause eye inflammation and damage.
- Inform your teacher of any health problems or difficulties you might encounter while doing a given experiment.
- Make sure you do not remove any chemicals or equipment from the lab unless your teacher tells you to do so.
- Never eat or drink anything in the laboratory.
- Report any accident or mishap to your teacher immediately no matter how trivial it might appear.
- Dispose of chemicals or broken equipment in the proper receptacle.
- Never pick up broken glass with bare hands.
- Never work alone in the lab; make sure your teacher is present when doing an experiment.
- Wash hands thoroughly before leaving the lab.
- Do not wear rings or bracelets during an experiment. Chemicals can seep under them causing severe injuries.
- Remember the appropriate evacuation procedure and route.
- Do not put chemicals or equipment in your lab drawer unless told to do so by your instructor.
- Never run or horseplay in the lab.

Students must abide by a student safety contract to be distributed by the teacher and signed by the student and the student's parent or guardian. Contracts must be collected and kept on file with each science instructor. A sample contract has been included for your use.

D. Parent Responsibility

In order for a laboratory component to be safely implemented in a science curriculum, it is essential that a teacher have the full cooperation of parents and/or guardians. Since students must be properly attired, have contact lenses removed, and be cognizant of safety equipment and possible hazards, the parent or guardian must help in assuming the responsibility for his/her child. It is the obligation of the parent or guardian to do the following:

- Carefully read and sign the safety contract.
- Insure that your child is dressed appropriately for school-based activities (hat, sunscreen and sunglasses for outdoor exploration or long-sleeve shirts and pants for indoor labs).
- Reinforce the no eating or drinking rule.
- Remind your child of the importance of using goggles and aprons.
- Review safety rules with your child on a regular basis.
- Remind your child of penalties for violating safety procedures.

E. Safety Contracts

The contract outlines the responsibilities of students, and is acknowledged by the parent. A copy of the signed contract is to be kept on file with the teacher. Students who do not return a signed copy of a laboratory safety contract are not permitted to conduct laboratory exercises until a contract is returned. Examples of safety contracts are provided on the next three pages.

K-5 Student Safety Contract

I know that being safe is important, and I agree to follow these rules:

- I will follow all written precautions and verbal instructions.
- I will do the experimental procedure as directed.
- I will not taste, eat, smell, or touch substances unless specifically told to do so by my instructor.
- I will handle all equipment and materials carefully and use as directed.
- I will wear safety goggles to protect my eyes when appropriate or as directed by the teacher.
- I will notify the teacher if any hazard is present.
- I will clean up my work area after each experiment.
- I will inform my teacher of any health problems or difficulties I might encounter while doing a given experiment.
- I will make sure I do not remove any substances or equipment from the lab or classroom unless my teacher tells me to do so.
- I will not eat or drink anything in the laboratory or classroom without my teacher's permission.
- I will report any accident or mishap to my teacher immediately no matter how trivial it might appear.
- I will not pick up broken glass with bare hands.
- I will make sure an adult is present when I am working in the lab or classroom.
- I will wear gloves when handling animals.
- I will not run or participate in horseplay in the lab or classroom.

Failure to follow these guidelines may result in reduction in grade, disciplinary action, and/or exclusion from laboratory activities.

Student Signature _____ _____
Date

Parent Signature _____ _____
Date

6-12 Student Laboratory Contract

I have been instructed in the necessary safety procedures required in this course. I agree to abide by the following guidelines:

- Safety apparel will be worn when specified by the instructor.
- Long or loose hair will be tied back. Excessively loose clothing or jewelry will not be worn.
- All safety rules and regulations will be followed.
- There will be no drinking or eating in the laboratory.
- Experiments will be done in the specified order with the prescribed quantities of chemicals.
- Only the chemicals specified by the teacher will be used. No unauthorized experimentation will be done.
- The proper use of safety equipment and correct evacuation procedures will be followed.
- Wash hands thoroughly before beginning and after completing an experiment.
- Contact lenses will not be worn during specified experiments.
- Horseplay or other inappropriate behavior will not be tolerated during laboratory experiments.
- Never taste chemicals or smell them directly.
- Never pick up broken glass with bare hands.
- Report all accidents, no matter how minor, to the teacher.
- Never work without teacher supervision in the lab.
- Do not remove any chemicals or equipment from the lab without the teacher's permission.

Failure to follow these guidelines may result in reduction in grade, disciplinary action, and/or exclusion from laboratory activities.

Student Signature _____ _____
Date

Parent Signature _____ _____
Date

Chemical Laboratory Safety Contract

PREPARE FOR LABORATORY WORK:

- Study laboratory procedures prior to class
- Never perform unauthorized experiments
- Keep your lab bench organized and free of apparel, books and other clutter
- Know how to use the emergency shower, eye wash, fire blanket, and first aid kit

DRESS APPROPRIATELY FOR LABORATORY WORK:

- Always tie back long hair
- No loose or baggy clothing
- Roll up loose sleeves as they tend to get in the way
- No open-toed shoes or sandals
- Wear lab coats during all laboratory sessions
- Wear safety goggles during all laboratory sessions except for pre-lab discuss
- Wear gloves when using chemicals that irritate or can be absorbed through the skin

AVOID CONTACT WITH CHEMICALS:

- Never taste or "sniff" chemicals
- Never draw materials in a pipette with your mouth
- Point the opening away from people, when heating substances in a test tube
- Never carry dangerous chemicals or hot equipment near other people

AVOID HAZARDS:

- Keep combustibles away from open flames
- Use caution when handling hot glassware.
- When diluting acid, always add acid slowly to water (A&W)--never water to acid.
- Only teachers should insert glass tubing through stoppers
- Turn off burners when not in use
- Do not bend or cut glass unless appropriately instructed by teacher
- Keep caps on reagent bottles and never switch caps with other containers

CLEAN UP:

- Consult with the teacher for proper disposal of chemicals
- Wash hands thoroughly following experiments
- Leave laboratory bench clean and neat

IN CASE OF AN ACCIDENT:

- Report all accidents and spills to the teacher immediately
- Place broken glass in designated containers using gloves to clean up glass shards
- Wash all acids and bases or other chemicals from your skin immediately with copious amounts of water
- If chemicals get in your eyes, wash them for at least 15 minutes with laboratory eye wash

I,_____, agree to: (a) Follow the teachers instructions, (b) protect my eyes, face, hands and body during laboratory, (c) conduct myself in a responsible manner at all times in the laboratory, and (d) abide by all of the safety regulations specified above.

Student Signature_____Date _

Parent (Guardian) Signature_____Date _____

III. Reporting Injuries and Emergencies

During the course of the school year, accidents may occur in the science laboratory that will require action by the teacher.

IN CASE OF EMERGENCY

- **ACCIDENTS:** Notify the administration as soon as possible. Have them call 911 if conditions warrant it. All accidents should be reported to the administration, in writing as soon after the incident as possible. An accident report sheet must be faxed to the proper location at Risk Management. The school office will have the necessary forms to report student accidents.

- **EVACUATIONS:** In the event of the need to evacuate a classroom or school (fire, gas leak, chemical spill, etc.), please follow the emergency evacuation plans as outlined in your school principals' emergency procedures handbook. Please discuss these procedures with your school-based administration in advance. All science teachers should be aware of the procedures for initiating and conducting a classroom /school evacuation. The teacher's primary responsibility is the safety and evacuation of students. **In the event of a fire, the teacher is to evacuate the students, and pull the fire alarm to evacuate the school.** All students must be accounted for.

- **SPILL OF A HAZARDOUS CHEMICAL:** Evacuate classroom immediately. Affected skin or clothing should go immediately under eye wash/shower/drenching unit. Avoid breathing the vapor if it is a liquid spill and turn on emergency exhaust. Notify an administrator and Chemical Hygiene Officer as soon as possible regarding the incident. Notify the health aide of any injuries. Follow the MSDS's instructions for clean-up procedures. Deny access to the area until cleanup has been completed.

LABORATORY HAZARDS & EMERGENCY ACTIONS

***IN ALL CASES* of injury, hazardous spill, material damage, etc.:**

1. FOLLOW EMERGENCY PROCEDURES FOUND BELOW
2. AS NEEDED, NOTIFY THE FRONT OFFICE AND PRINCIPAL FOR ASSISTANCE
3. BE PREPARED TO ACT: ***Know the location and how to use the evacuation routes, eye wash, emergency shower, fire blanket, fire extinguisher, fume hood, exhaust systems, shutoffs, etc.***

EQUIPMENT OR ROOM FIRE

- Evacuate students
- Activate (pull) nearest Fire Alarm Pull Station
- Turn off gas master shutoffs
- Turn off gas master shutoffs
- Call front office or directly call 911
- Close doors and windows
- Close flammable and acid lockers
- Unplug all appliances and equipment

BODY FIRE

- Evacuate, if necessary
- Activate (pull) nearest Fire Alarm Pull Station
- Use a fire blanket (drop & roll)
- Immediately flush with cool water
- Call 911
- Call nurse's office

FAINTING

- Immediately move person to fresh air
- If due to a chemical, evacuate students and activate the emergency exhaust fan
- Keep the head lower than the rest of the body
- Keep warm and/or cover with blanket
- Call nurse's office
- If breathing or heart stops, apply CPR/artificial resuscitation while you send someone to call 911

BODY BURNS

- Follow MSDS emergency and first aid procedures
- Send student to the nurse's office with an escort

TOXIC EXPOSURES / POISONING

- Call 911 and/or poison control
- Follow MSDS emergency and first aid procedures
- Call front office/nurse
- Identify substance
- Give MSDS to emergency personnel

CHEMICAL SPILLS ON BODY

- Follow MSDS emergency/first aid procedures
- Call 911
- Identify substance
- Remove clothing or contacts as needed
- Call front office/nurse
- Give MSDS to emergency personnel

MINOR CUTS

- Follow MSDS emergency and first aid procedures
- Follow universal precautions
- Allow to bleed briefly
- Wash with soap and water
- Apply antiseptic and sterile bandage

FLOOR OR COUNTER SPILL

- Follow MSDS emergency and first aid procedures
- Activate emergency exhaust fan
- Evacuate if PEL exceeded or chemical an irritant
- Clear students from the spill area if necessary
- Follow **SPILL KIT** (**Appendix C**) procedures
- Contact Maintenance/Head Custodian for disposal

EYE INJURY

- Follow MSDS emergency and first aid
- Flush eye with water for at least 15 minutes using emergency eye wash
- Remove contacts, if necessary
- Do not rub eye
- Call front office/nurse

AFTER THE EMERGENCY

- Cleanup and prepare for the next emergency
- File a Student Accident/Incident Report or a worker's comp Report of Injury
- Get statement from witnesses
- Repeat safety training

IV. Facilities Safety Requirements:

State Board Regulations: http://www.fldoe.org/edfacil/sref.asp
For additional information: http://www.fldoe.org/edfacil/

Science teachers must become safety conscious advocates. It is dangerous to assume that students remember safety procedures and equipment discussed at the beginning of the school year. It is advisable that teachers emphasize safety techniques that pertain to specific laboratory activities at the time these events occur. The science instructor should always be alert to possible safety hazards and conditions in an activity. Laboratory exercises should be modified and students reminded of proper lab procedure every time a potentially hazardous situation is encountered.

A. Fire Extinguishers and Fire Blankets: Fire extinguishers and fire blankets are provided as follows (Class ABC extinguishers may be used for all types of fires classified as A, B, or C except as modified below):

- Fire extinguishers and fire blankets are placed in locations which are readily accessible and suitable for the hazard present and are readily visible.

- Extinguishers and blankets are on hangers or brackets, shelves, or cabinets so that the top of the extinguisher or blanket is five (5) feet or less AFF. [Objects projecting more than four (4) inches from the wall comply with state and federal accessibility requirements.]

- Class B fire extinguishers of at least 20-B:C capacity are installed in spaces where flammable liquids are stored, such as science labs, auto shops, boiler rooms, duplicating stations, and bulk storage of paints; and extinguishers are located so that the travel distance from any point in the space to an extinguisher is fifty (50) feet or less.

- Fire extinguishers are readily accessible at all times. (Fire extinguishers may be located inside student-occupied spaces provided they are located adjacent to the primary exit door, the door remains unlocked when the facility is occupied, and a permanently affixed sign, with a red background and white letters reading "FIRE EXTINGUISHER INSIDE" is placed on the outside adjacent to the door.)

- Fire blankets are located in each laboratory and each shop where a personal fire hazard may exist.

B. Design: Laboratories and Shops. Laboratories and shops comply with the general requirements found elsewhere in this section as well as the special safety provisions found herein.

1. Each laboratory type space, such as chemistry, physics, and home economic labs, and each shop type space, such as automobile, wood working, and welding shops, equipped with unprotected gas cocks, compressed air valves, water service, and electric service, easily accessible to students, has master control valves or switches with permanently attached handles. (Ordinary office machines, non-hazardous machines, and domestic sewing machines are not required to have emergency shut-off. **A science laboratory is a facility where science investigations occur and where potentially hazardous chemicals, materials, or conditions may exist.**

a. The master control valves and switches are clearly labeled and located in a non-lockable place accessible at the instructor's station to allow for emergency cut-off of services, and valves completely shut-off with a one-quarter turn.

b. The master control valves and switches are in addition to the regular main gas supply cut-off, and the main supply cut-off is shut down upon activation of the fire alarm system.

2. Every science room, lab, or shop where students handle materials or chemicals potentially dangerous to human tissue is provided with a dousing shower, floor drain, and eye wash facilities. A **dousing shower** must deliver a large amount of water in a very short period of time, no less than 30 gallons per minute at 30 psi, to reduce flammable/chemical exposure to the body. A **floor drain** is a grate-covered, plumbed opening in the floor that can evacuate the large amounts of water produced by the operation of a safety shower or eye wash station. The drain shall be located directly below the safety shower and eye wash station. An **eye wash facility** is a fixture that provides a minimum of 15 minutes of continuous irrigation to both eyes simultaneously. It must be easily activated and drained.

3. Laboratory and shop spaces, such as the following, are provided with exhaust systems:

a. Chemistry laboratories have a high capacity emergency exhaust system and are provided with a source of positive ventilation and signs providing instructions are permanently installed at the emergency exhaust system fan switch. A high capacity emergency exhaust system must be present in chemistry laboratories and shall be capable of the rapid mechanical exhaust of between 6 and 12 room air exchanges per hour. The system must be separate from the fume hood and must possess a source or positive ventilation. The air that is exhausted must not mix with other building air supplies. The **Emergency Exhaust System** is required in every science room with a manual switch to turn on the emergency exhaust system that is clearly labeled with a permanent sign.

b. Chemistry labs are provided with fume hoods and fume hood supply fans automatically shut down when the emergency exhaust fan is turned on.

4. Storage:

a. The areas above or below exit stairs and ramps, whether interior or exterior, are free of any storage rooms or closets and are not used for storage of any kind.

b. General Storage: General storage areas are kept separated from mechanical spaces and are equipped with shelving, racks, bins, or other devices necessary to protect the stored materials, supplies, equipment, and books.

c. Chemical and Hazardous Storage: Chemical and hazardous storage facilities comply with the following:

- Rooms and/or cabinets used for the storage, handling, and disposal of chemicals are lockable, vented to the exterior, and have shelves with a one-half inch lip on the front; and door locks are operable at all times from the inside of the room, even if key locked from the outside; and rooms are kept at moderate temperatures and well illuminated. Room venting: Chemical and biological storage rooms which contain chemicals must be provided with the high capacity exhaust system. Flammable cabinets not located in a properly exhausted storage room may need to be vented. Ventilation shall provide adequate air exchanges in rooms where chemicals or preserved biological specimens are stored at a rate of 6-12 room air changes per hour. *Temperatures in rooms where chemicals are stored may not exceed 85 degrees F/29 degrees C.*

- Buildings and/or rooms used for the storage, handling, and disposal of flammable, poisonous, or hazardous materials or liquids, and equipment powered by internal combustion engines and their fuels are kept in a safe, secure, and orderly condition at all times and shall comply with all applicable NFPA standards. Work areas shall be clean and uncluttered with chemicals and equipment properly labeled and stored. A clear aisle at least three feet wide shall be maintained.

- Explosion-proof heat detectors, electrical fixtures, switches, and outlets in flammable storage rooms are maintained in an operational condition at all times. *Explosion Proof Heat Detector: A device which may activate within a specified temperature range and is incapable of causing an explosion during its operation.*

5. **Mechanical:** Mechanical systems meet the following minimum safety, casualty, and sanitation requirements for ventilation, building service equipment, plumbing, etc., including re-locatable equipment or systems, as applicable: All occupied rooms and other rooms where odors or contaminants are generated are provided with either natural or mechanical ventilation. The ventilation system should provide adequate air changes for

science laboratory rooms where biological or chemical investigations are being conducted. Windows, louvers, or other openings utilized for natural ventilation are maintained in an operable condition at all times. Mechanical ventilation systems are maintained in an operable condition at all times.

6. Electrical: Electrical systems meet the following minimum safety, casualty, and sanitation requirements for illumination, fire alarms, detector systems, etc., including re-locatable systems, as applicable.

a. Fire Alarms and Heat/Smoke Detectors: Fire alarms and heat or smoke detectors are maintained in an operational condition at all times.

b. Explosion-proof detectors are installed in flammable storage rooms.

c. Electrical wiring and equipment are maintained in a safe and secure condition at all times and comply with the following:

Electrical outlets:

- All outlets are grounded.
- All convenience outlets installed within two (2) feet [within six (6) feet for new construction under SREF 97] of water supplies, wet locations, toilet rooms and the exterior with direct grade level
- Access has a ground fault circuit interrupt protection device (GFCI). (The ground fault circuit interrupt protection device is not required for grounded receptacles serving only water coolers, if the receptacle is single or covered behind the water cooler enclosure.)
- Outdoor ground fault interrupter protected outlets are provided for all buildings.
- Flammable storage rooms are free of electrical receptacles.
- Extension cords are free of being stapled to any surface or run through or over doors, windows, or walls. They are used only in continuous lengths and without splice or tape. Adapters comply with Underwriters Laboratory (UL) and have over-current protection with a total rating of no more than fifteen (15) amperes.

d. Emergency Shut-Off Switches: Every laboratory space which has electrical receptacles at student work stations has an unobstructed emergency shut-off switch within fifteen (15) feet of the instructor's work station.

7. Eye Protection and Goggle Sanitation Devices: School laboratories should include protective apparel compatible with the required degree of protection for substances being handled. This includes eye protection. Eye-protective devices shall be worn by students, teachers and visitors in courses including, but not limited to, chemistry, physics, or chemical-physical laboratories, at any time at which the individual is engaged in or

observing an activity or the use of hazardous substances likely to cause injury to the eyes. Eye and face protection shall be sanitized on a regular basis. **Florida Law 232.45**

*Recommended Eye Protection: American National Standards Institute (ANSI) coded Z87 or Z87.1 type G or H - **SPLASH PROOF** eye protection to be worn by students, teachers and visitors to the laboratory. Please note:* Just because eyewear meets Z87.1 standards does not necessarily mean it provides adequate protection from the dangers of splashed chemicals. Eyewear that does not provide a complete, snug seal around the eyes may be fine for some activities but not when using hazardous chemicals.

8. **First Aid Kits** should be purchased by each school and be made available in the laboratories with their location clearly marked. The instructor should take inventory of the kit on a regular basis. The instructor and students should be aware of the proper use of the contents of the first-aid kit.

9. Eye Protection, Goggle Sanitation, and Eyewashes:
Florida Law 232.45 requires all K-12 students engaged in scientific investigation or laboratory activity to be provided with approved eye protection. All safety goggles and glasses must comply with ANSI Z 87.1 – 2003. Only safety goggles and/or glasses marked with "Z 87.1" should be purchased; the "Z 87.1" mark will appear on the frame or the lens. It is the responsibility of the District, School, Teacher and Administration to select and provide eyewear that provides students with the most appropriate protection for the hazards of the science investigation or laboratory activity.

Duty of Instructor: *A teacher must reasonably address all foreseeable dangers inherent in any laboratory experiment or demonstration that will be performed in the science laboratory or classroom. A teacher must also instruct and ensure that students demonstrate the proper use of protective equipment.*

A Goggle Sanitizing Cabinet is required by the State of Florida for students whom are required to use personal eye protection in accordance with the American National Standard Institute (ANSI) Z87.1-1979 standards for use, durability, and cleaning. Science Teachers and students must wear goggles in the laboratory at all times with the exception of pre-lab discussion. Appropriate chemical resistant goggles can be purchased through your school's science supply budget. Contact lenses should not be worn in the laboratory. If wearing contacts is unavoidable, the use of non-vented chemical splash goggles is required. Goggles must be sanitized between uses by a goggle sanitizing cabinet.

Eye wash stations are required in all science laboratories, and are strongly recommended for elementary classrooms conducting scientific exploration:
Elementary classroom sinks can easily be modified to include an eye wash. It is recommended that minimally there is an eye wash available in the clinic for emergency use. Staff should be trained in the proper use of the eyewash, and the proper sanitation techniques for safety goggles.

V. Laboratory Safety Equipment Checklist:

Before your year begins, make sure that your laboratory is a safe laboratory. The following items should be in all properly maintained lab rooms. If your location is improperly equipped, please inform your science administrator and always conduct laboratories in properly equipped, safe rooms.

- Master shut-off switches should be located within each lab room. Water, gas and electricity should be turned off when not in use.
- Adequate numbers of tri-class (ABC) fire extinguishers (at least one per room).
- Eyewash stations: 30 steps or 15 seconds from any location in the room.
- Safety Shower: accessible on three sides, 30 steps or 15 seconds from any location in the room, 30-60 gallons per minute at a pressure of 20-50 psi.
- Fume Hood (for chemical laboratories): vented through roof, face velocity 60-100 feet/minute (18-30 meters / minute). The hood should not be within 10 feet of an exit or a main aisle.
- All electrical outlets within 5 feet of sinks should be fitted with Ground-Fault Interrupters (GFI).
- Retardant-treated wool fire blanket: 30 steps or 15 seconds from any location in the room.
- Approved safety goggles: American National Standards Institute (ANSI) coded Z87 or Z87.1 G or H - **SPLASH PROOF** eye protection must be worn by students, teachers and visitors to the laboratory according to Florida State law 232.45.
- Sanitizing and/or sterilizing equipment for safety goggles.
- An approved safety shield should be used whenever the possibility of an explosion is present.
- Non-absorbent, chemical-resistant aprons should be provided for each student during lab activities where there is a danger of spillage or spattering of chemicals or hot liquids.
- Separate acids cabinet and flammables cabinet should be secured in the storeroom.
- A container should be provided and clearly marked for the disposal of broken glass only.
- A chemical spills kit must be available for general chemical spills.
- A stock supply of vinegar and baking soda for base and acid spills should be available during acid and base lab activities. Disinfectants and 10% Clorox bleach solutions should be used to sterilize equipment and wash down counter tops.
- An adequately stocked first-aid kit for teacher use should be easily accessible in an emergency.
- MSDS catalog or safety sheets: know the hazards associated with all the chemicals used in the class experiments.
- Proper chemical containers: do not repackage chemicals into smaller containers unless the new containers are chemically secure, appropriately dated, and labeled.
- Safety posters should be prominently displayed in the room.
- Emergency procedures and telephone numbers should be prominently posted in the room.

VI. SAFE Class Size

There are no specific laws or board rules that dictate the safe size of a laboratory classroom. The final determination of safety is the responsibility of the instructor. If the instructor feels the class size is too large to safely conduct a laboratory investigation then the investigation should not be conducted. The following recommendation may assist in determining safe laboratory size in your school:

Two major factors in determining an appropriate class size are the number of special needs students and the extent of their needs. NFPA Occupancy Load standards require a minimum of 50 net square feet per occupant in science laboratories. Academic professional standards by the National Science Teachers Association (NSTA) set a maximum of 24 students for any laboratory course in science. For safety as well as pedagogical purposes, if the number of special needs students increases, then the NFPA square footage per occupant should be increased and the NSTA maximum number of students in a laboratory should be reduced in a class size.

VII: The Chemical Hygiene Plan: Chemical Purchasing, Storage, Disposal, and Prohibited Chemicals:

According to OSHA, a Chemical Hygiene Plan (CHP) is written to: protect laboratory workers from health hazards associated with hazardous chemicals, keep exposures below specified limits and to have the CHP readily available for review upon request. OSHA believes that controlling a hazard at its source is the best way to protect a worker. In accordance with OSHA, the CHP shall include the following elements:

A. Chemical Purchasing: In order to minimize chemical hazards and difficulties with chemical storage, the notion that **"less is better"** plays a major role in establishing purchasing policy. Remember that a chemical is yours from its cradle to its grave. Once purchased, you own that chemical and must dispose of it properly when finished. Even if a disposal company is hired, the ultimate responsibility for the chemical is still yours.
The State of Florida recommends the following purchasing criteria:

- Purchase only a one-year supply of the chemicals necessary to implement your instructional program.
- Do not buy bulk chemicals and repackage into smaller quantity bottles. Reagent bottles and caps are designed to minimize specific hazards.
- Store Material Safety Data Sheets (MSDS) for each received chemical in a convenient location. Possible hazards in handling, storage, and disposal should be understood before the chemical is used. MSDS sheets should be referenced for proper handling, storage and for appropriate personal protective equipment. If an MSDS is not available, request one from the manufacturer or obtain on online at http://www.msdsonline.com. **NOTE:** The format of the MSDS will be changing to a standardized Safety Data Sheet (SDS). More information on the SDS may be found at: https://www.osha.gov/Publications/OSHA3642.html
- The maximum size container in which to order all liquid reagents (acids, bases, and solvents) is one pint (500 ml).
- The maximum size container in which to order all solid reagents is one pound (500 grams).
- All indicators or dyes should be purchased in pre- mixed solutions whenever possible.

- All chemicals purchased should be of technical grade purity, unless a higher purity is needed for an experiment or the chemicals are only available in reagent grade.
- Chemical requisitions should be separate from supply and equipment requisitions.
- A chemical inventory should be kept and updated regularly.
- No school in the State of Florida shall accept gifts of chemicals from individuals, government installations, corporations, companies, or any other source without the specific authorization of the appropriate District Level Science Supervisor.

B. Chemical Storage

Remember that a chemical is yours from its cradle to its grave. Once purchased, you own that chemical and must dispose of it properly when finished. Even if a disposal company is hired, the ultimate responsibility for the chemicals is still yours.

- Store chemicals in compatible families. **Do not store chemicals alphabetically!** *The industrial color coding for storage and the Flinn Scientific Recommend Storage coding is provided below.*
- Whenever possible, avoid storing any chemicals on the floor.
- Shelves should be of wood construction and firmly secured to walls by the use of fixed wooden supports. Do not use metal, adjustable clips.
- Provide anti-roll lips on shelves whenever possible.
- Store flammables in a dedicated flammable cabinet. *See the NFPA template for reactivity coding provided below.*
- Store metals and hydrides away from any water.
- Store ammonium nitrate away from other chemicals.
- Chemicals prone to instability should be dated and disposed of after use.
- Do not use the fume hood as a storage area.
- Label all chemicals with the date of receipt.
- Store all compressed gases separately.
- All chemical storage areas should be locked and clearly designated off limits to everyone except authorized personnel.
- Solid chemicals should only be purchased in one pound bottles and liquids in one-pint bottles.
- Do not store chemicals in your classroom. Keep them locked in the chemical storage room.
- Chemicals should be accessible to students during actual laboratory exercises only.
- Never store chemicals on the floor of storage areas nor on the top of storage cabinets. Keep storage areas free from clutter.
- Order enough chemicals for one school year only.
- Know the hazards associated with all the chemicals used in class experiments.
- Do not repackage chemicals into smaller containers unless the new containers are chemically secure, appropriately dated, and labeled.
- Isolate nitric acid within the acid storage cabinet by enclosing it in a high density polypropylene container because it not only is an acid but also an oxidizer.

Industrial Color-Coding and Storage:

allows for the separation of chemicals into compatible hazard types. See Below:

Green – Low Hazard
Red – Flammable
Yellow – Oxidizer
White – Corrosive
Blue - Poison

AREA 1
MINIMUM TO MODERATE HAZARDS

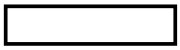
Storage Code Green: suitable for general storage areas.

AREA 2
FLAMMABILITY HAZARD

Storage Code Red Store in flammables area, separating water compatible and water incompatible groups.

AREA 3
CONTACT HAZARD

Storage Code White: store in corrosion-proof area separating acids and strong bases. Nitric acid should be isolated.



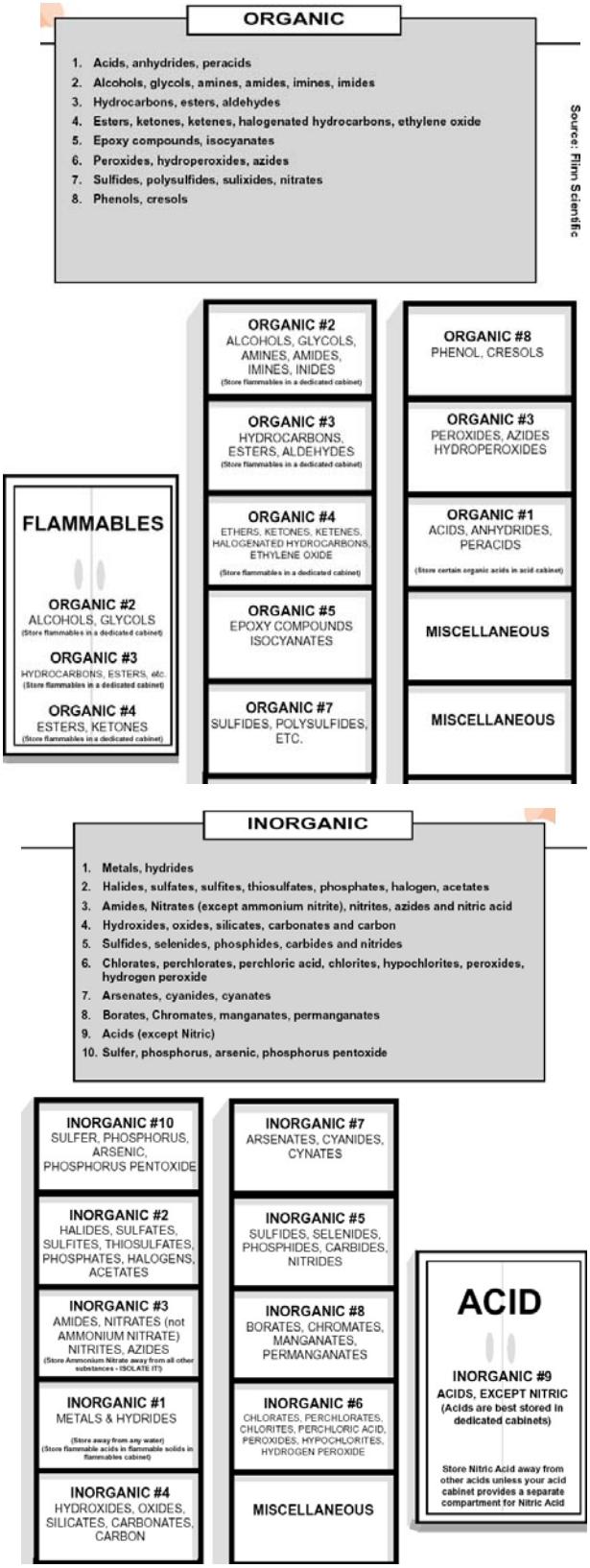
AREA 4
REACTIVITY HAZARD

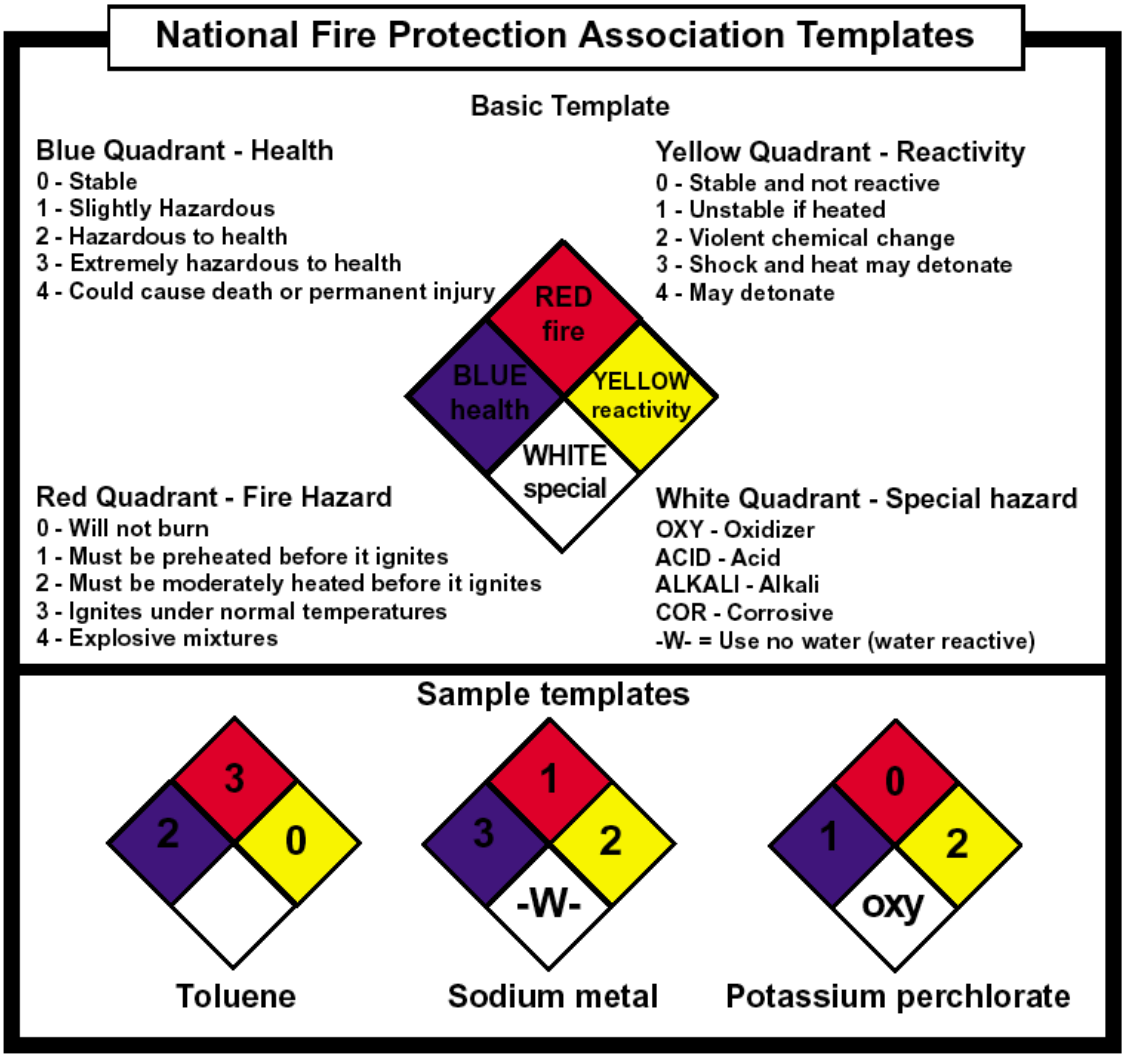
Storage Code Yellow: Oxidizers must be stored away from flammables and combustibles.

AREA 5
HEALTH HAZARD

Storage Code Blue: Store in secure poisons area.

FLINN STORAGE CATEGORIES





C. Disposal Techniques

The aim of a waste disposal program is to assure minimal harm to humans or the environment from the disposal of waste laboratory chemicals and their by-products left from curriculum experiments. The program is required to specify how waste is to be collected, segregated, stored and transported. Transportation from the school must be in accordance with Department of Transportation regulations or lab-packed with licensed and insured Hazardous Waste Transporters.

The Environmental Protection Agency has established a manifest system that requires the waste generator to keep detailed records and to report to the agency. Under these guidelines, a chemical and all the waste generated from it is the responsibility of the purchaser from "cradle to grave."

Even if a disposal company is hired, the ultimate responsibility for the chemical is still the purchaser's. The following guidelines are to be observed.

- The only disposal "treatment" permitted in the District is the neutralization of small quantities of acids and bases.
- Most chemicals should be boxed (compatible families) for removal. Each box will be tagged with its contents. The box(s) must remain in the chemical storage room or designated area.
- Box flammable liquids separately. Each box will be tagged with its contents. The chemical disposal form may be used to tag each box.
- Outdated diethyl ether (ethyl ether) should not be handled. If you have a container of outdated ether, have your administrator contact your district office immediately.
- All unlabeled, outdated, prohibited and/or potentially hazardous chemicals or those chemicals in excess of the maximum storage quantity must be boxed (compatible families) for disposal.

Other Hazardous Materials: Other items, including used batteries, halogen bulbs (containing mercury), old thermometers (containing mercury) or other materials identified as hazardous may be boxed for removal and stored in the chemical storage area.

Once chemicals and hazardous materials are boxed and labeled in the chemical storage area, contact your local district representative to schedule a chemical collection.

** Disregard "Flinn Scientific, Inc." catalog's referenced disposal treatment methods since they are considered illegal in the state of Florida. The only disposal "treatment" permitted in the State of Florida is the neutralization of small quantities of acids and bases. All other chemicals must be contained, labeled and disposed of accordingly.*

Disposal Guidelines may be found at: http://www.fldoe.org/edfacil/sc3/sc3dgc.asp
Additional information: http://www.dep.state.fl.us/waste/categories/shw/default.htm

D. Excessive Risk Chemicals - Risk Exceeds Educational Utility and Prohibited Chemicals.

Chemicals categorized as human or animal carcinogens, mutagens, teratogens, highly toxic, explosive, or corrosive may exceed educational utility in schools. In all cases, these substances are considered so hazardous that their potential danger outweighs their educational benefit. The following definitions are important in discussing chemical safety:

MUTAGEN	A substance capable of causing changes in genetic material of a cell, which can be transmitted during cell division.
HIGHLY TOXIC	Agents or substances that when inhaled, absorbed or ingested in small amounts can cause death, disablement, or severe illness.
EXPLOSIVE	An unstable substance capable of rapid and violent energy release.
CORROSIVE	A substance that causes destruction of tissue by chemical action on contact.
IRRITANT	A substance that on immediate, prolonged, or repeated contact with normal tissue will induce a local inflammatory reaction.
CARCINOGEN	A substance capable of causing cancer or cancerous growths in mammals.

The Florida Department of Environmental Protection, in partnership with the Florida Department of Education and the National Institute for Occupational Safety and Health, has coordinated a school science laboratory cleanout endeavor as part of the federal Environmental Protection Agency's School Chemical Cleanout Campaign, or SC3 Program. The ultimate goal of the School Chemical Cleanout Campaign has been to create a chemically safe school environment in which chemicals are purchased wisely, stored safely, handled by trained personnel, used responsibly, and disposed of properly.

The following list of chemicals are considered high risk, and hazardous. Hazards include toxicity, carcinogenicity, teratogenicity, flammability, and explosive propensity. Some items may be available as dilute solutions for advanced coursework.

For additional information on the SC3 program, chemical clean out or recommendations for schools, please visit the Florida Department of Environmental Protection at:
http://www.dep.state.fl.us/waste/categories/hazardous/pages/schoolchemicals.htm

SC3 Brochure:
http://www.dep.state.fl.us/waste/quick_topics/publications/shw/hazardous/SC/SCCC_BrochureReducedSize3.pdf

SC3 Manual:
http://www.dep.state.fl.us/waste/quick_topics/publications/shw/hazardous/SC/SCC_Manual.pdf

Information on the Florida Department of Education Laboratory Clean-out program may be found at: http://www.fldoe.org/edfacil/sc3/

Information on the National Institute of Occupational Safety and Health guidelines of hazardous materials and school laboratory safety may be found at:
http://www.cdc.gov/niosh/docs/2007-107/pdfs/2007-107.pdf

Excessive Risk Chemicals - Risk May Exceed Educational Utility

Chemical Name	Hazards
Acetic Anhydride	Explosive potential, corrosive
Acetyl Chloride	Corrosive, dangerous fire risk, reacts violently with water and alcohol
Acrylamide	Toxic by absorption, suspected carcinogen
Acrylonitrile	Flammable, poison
Adipoyl Chloride	Corrosive; absorbs through skin, lachrymator
Aluminum Chloride, anhydrous	Water reactive, corrosive
Ammonia, gas	Corrosive lachrymator
Ammonium Bifluoride	Reacts with water, forms Hydrofluoric Acid
Ammonium Bichromate	May explode on contact with organics, suspected carcinogen
Ammonium Chromate	Oxidizer, poison; may explode when heated
Ammonium Dichromate	Reactive, may cause fire and explosion
Ammonium Perchlorate	Explosive; highly reactive
Ammonium Sulfide	Poison, Corrosive, Reacts with Water & Acids
Aniline	Carcinogen, toxic, absorbs through skin
Aniline Hydrochloride	Poison
Antimony Oxide	Health and contact hazard
Antimony Powder	Flammable as dust, health hazard
Antimony Trichloride	Corrosive; emits hydrogen chloride gas if moistened
Arsenic compounds	Poison, carcinogen
Asbestos, Friable	Inhalation Health Hazard, Carcinogen
Azide Compounds	Explosive in contact with metals, extremely reactive, highly toxic
Barium Chromate	Poison
Benzene	Flammable, carcinogen
Benzoyl Peroxide	Organic peroxide, flammable, oxidizer
Beryllium and its compounds	Poison. Dust is P-listed & highly toxic. Carcinogen
Bromine	Corrosive, oxidizer, volatile liquid
Cadmium compounds	Toxic heavy metal, carcinogen
Calcium Fluoride (Fluorspar)	Teratogen. Emits toxic fumes when heated
Carbon Disulfide	Flammable, toxic, P-Listed Extremely Hazardous
Carbon Tetrachloride	Toxic, carcinogen
Chloral Hydrate	Hypnotic drug. Controlled substance
Chlorine	Poison gas. Corrosive.
Chlorobenzene	Explosive limits 1.8% to 9.6%, toxic inhalation and contact hazard
Chloroform	Carcinogen. If old forms deadly Phosgene gas.
Chlorosulfonic Acid	Toxic a/k/a Sulfuric Chlorohydrin
Chromic Acid	Strong oxidizer. Poison
Collodion	Flammable. Explosive when dry. Nitrocellulose compound.
Cuprous Cyanide	Toxic
Cyanogen Bromide	Poison, strong irritant to skin and eyes
Cyclohexene	Flammable, peroxide former
Dichlorobenzene	Toxic
Dichloroethane	Flammable. Toxic.
Dinitro Phenol	Explosive. "Bomb Squad"
Dinitrophenyl Hydrazine	Severe explosion and fire risk
Dioxane	Flammable, peroxide former
Ether, Anhydrous	Flammable, peroxide former
Ether, Ethyl	Flammable, peroxide former

Excessive Risk Chemicals - Risk Exceeds Educational Utility

Chemical Name	Hazards
Ether, Isopropyl	Flammable, peroxide former
Ethyl Ether	Flammable, peroxide former
Ethylene Dichloride	Toxic, contact hazard, dangerous fire risk, explosive in air 6-16%
Ethyl Nitrate	Explosive. "Bomb Squad"
Ethyleneimine	Flammable. Toxic. P -listed
Ferrous Sulfide	Spontaneously ignites with air if wet
Formaldehyde(Formalin)	Toxic, carcinogen, sensitizer
Gunpowder	Explosive
Hydrazine	Flammable Absorbs thru skin Carcinogen. Corrosive
Hydriodic Acid	Corrosive. Toxic
Hydrobromic Acid	Corrosive. Poison
Hydrofluoric Acid	Corrosive, poisonous
Hydrogen	Flammable
Hydrogen Sulfide, gas	Poison. Stench
Immersion Oil (old)	May contain 10-30% PCBs such as Arochlor 1260.
Isopropyl Ether	Flammable, Highest-risk peroxide former
Lithium Aluminum Hydride	Flammable. Reacts with air, water and organics
Lithium Metal	Reacts with water, nitrogen in air
Mercaptoethanol	Flammable. Corrosive. Intense stench
Mercury compounds	Poisonous heavy metal
Mercury, liquid	Toxic heavy metal, carcinogen
Methylene Chloride	Toxic, carcinogen, narcotic
Methyl Ethyl Ketone	Flammable, dangerous fire risk, toxic
Methyl Iodide (Iodomethane)	May be a narcotic; Carcinogen. Lachrymator.
Methyl Isocyanate	Flammable, dangerous fire risk, toxic
Methyl Isopropyl Ketone	Toxic
Methyl Methacrylate	Flammable. Vapor causes explosive mix with air
Naphthylamine, a-	Combustible, Toxic. Carcinogen.
Nickel Oxide	Flammable as dust. Toxic, carcinogen
Nicotine	Poison. P-Listed Extremely Hazardous
Nitrilotriacetic Acid	Corrosive
Nitrobenzene	Highly toxic
Nitrocellulose	Flammable. Explosive. Call ETSI
Nitrogen Triiodide	Explosive. "Bomb Squad"
Nitroglycerin	Explosive. "Bomb Squad"
Osmium Tetraoxide (Osmic Acid)	Highly toxic. P-Listed Extremely Hazardous.
Pentachlorophenol	Extremely toxic
Perchloric Acid	Powerful oxidizer, reactive
Phosphorus Pentasulfide	Water Reactive. Toxic. Incompatible with Air & Moisture
Phosphorus Pentoxide	Oxidizer, toxic
Phosphorus, Red	Flammable solid
Phosphorus, Yellow or White	Air reactive. Poison.
Picric Acid, Trinitrophenol	Explosive when dry
Potassium Cyanide	Poison. P-Listed Extremely Hazardous
Potassium Perchlorate	Powerful oxidizer. Reactivity hazard
Potassium Sulfide	Flammable. May ignite spontaneously.
Potassium, metal	Water reactive, peroxide former (orange fog/crystals)

Excessive Risk Chemicals - Risk Exceeds Educational Utility

Chemical Name	Hazards
Pyridine	Flammable. Toxic. Vapor forms explosive mix with air
Selenium	Toxic.
Silver Oxide	Poison
Silver Cyanide	Extremely toxic
Sodium metal lump	Water reactive, ignites spontaneously in dry hot air, corrosive
Sodium Arsenate	Toxic. Carcinogen.
Sodium Arsenite	Toxic. Carcinogen.
Sodium Azide	Poison, explosive reaction with metals. P-Listed Extremely Hazardous
Sodium Borohydride	Flammable Solid. Water Reactive
Sodium Cyanide	Poison. P-Listed Extremely Hazardous
Sodium Fluoride (Bifluoride)	Highly toxic by ingestion or inhalation; strong skin irritation
Sodium Fluoroacetate	Tox-X Deadly poison!
Sodium Peroxide	Water reactive; may cause fire & explosion
Sodium Sulfide	Fire and explosion risk
Strontium	Flammable. Store under naphtha. Reacts with water.
Testosterone HCl	Controlled substance
Tetrahydrofuran	Flammable, peroxide former
Thioacetamide	Toxic. Carcinogen. Combustible.
Thionyl Chloride	Corrosive.
Thiourea	Carcinogen
Titanium Trichloride	Flammable. Fire risk.
Triethylamine	Flammable. Toxic. Irritant.
Trinitrobenzene	Explosive. "Bomb Squad"
Trinitrophenol	Explosive. "Bomb Squad"
Trinitrotoluene	Explosive. "Bomb Squad"
Uranium/Uranyl Compounds	Radioactive

High Risk Chemicals - Only Allow Very Limited Amounts in Storage
Only Appropriate for Advanced-Level High-School Science Classes

Chemical Name	Hazards
Acetamide	Carcinogen. P-Listed Extremely Hazardous
Ammonium Nitrate	Powerful oxidizer, reactive
Barium Peroxide	Fire and explosion risk with organic materials, oxidizer, toxic,
Butyric Acid	Corrosive; intense stench
Cadmium sulfide	Highly toxic, carcinogen
Calcium Carbide	Flammable. Reaction with water.
Chromium Trioxide	Oxidizer, Poison
Ethidium Bromide	Potent Mutagen
Hexamethylenediamine	Corrosive; absorbs through skin, lachrymator
Hexanediamine, 1-6	Corrosive; absorbs through skin, lachrymator
Hydrogen Peroxide, >29%	Powerful oxidizer, corrosive to skin
Lead compounds	Highly toxic
Lead Nitrate	Toxic heavy metal. Oxidizer
Magnesium, powder	Flammable
Mercury Thermometers	Toxic heavy metal, corrosive
Phenol	Poison
Potassium Chlorate	Powerful oxidizer, reactive
Potassium Chromate	Oxidizer. Toxic
Potassium Dichromate	Powerful oxidizer, carcinogen
Radioactive Materials	Radioactive
Sebacoyl Chloride	Corrosive fumes. Lachrymator
Silver compounds	Toxic
Sodium Chlorate	Powerful Oxidizer
Sodium Chromate	Oxidizer
Sodium Dichromate	Reactive, may cause fire and explosion
Sodium, metal, small chips	Water reactive, corrosive
Strontium Nitrate	Oxidizer. May explode when heated or shocked.
Thermite	Flammable solid
Toluene	Flammable, dangerous fire risk, toxic
Wood's Metal	Poison.
Xylene	Flammable, toxic

"Hazardous Waste Management School Chemical Cleanout Campaign." *Hazardous Waste Management School Chemical Cleanout Campaign*. Florida Department of Environmental Protection Hazardous Waste Regulation Section, 2014. Web. <http://www.dep.state.fl.us/waste/categories/hazardous/pages/schoolchemicals.htm>.

Prohibited Chemicals

A - Extremely Hazardous **1 -Very Common (76-100%)**

B - Hazardous **2 -Common (51-75%)**

C - Somewhat Hazardous **3 - Infrequent (26-50%)**

D - Relatively Non-Hazardous **4 - Very Infrequent (0-25%)**

Aniline	A4
Aniline hydrochloride	B4
Antimony trichloride	B4
Arsenic	A4
Arsenic trioxide	A4
Asbestos	A4
Benzene	A4
Benzoyl peroxide	A4
Chlorine	A3
Chloretone	A4
Chloroform	A4
Chromium	B4
Chromium oxide	B4
Chromium potassium sulfate	B4
Chromium trioxide	A4
Colchicine	A3
Dichloroethane/Ethylene dichloride	A3
p-Dioxane	A4
Hydrobromic acid	A4
Hydrofluoric acid	A4
Hydrogen	A3
Lithium metal	A4
Mercury	A4//H4,FO,R1,C3
Mercuric chloride	A4/Sol. B4
Nicotine	B4
Phenol	A4
Phosphorus, red, white	A4
Phosphorus pentoxide	A4
Picric acid	A4
Potassium metal	A4
Pyridine	B4
Pyrogallic acid/pyrogallol	B4
Sodium arsenate	A4
Sodium arsenite	A4
Sodium azide	A4
Sodium cyanide	A4
Sodium dichromate	B4/Sol. C4
Sodium metal	A3
Sodium nitrite	B4/Sol. C4
Stannic chloride	B4
Stearic acid	D4
Sudan IV	B4
Thiourea	B4
O-Toluidine	B3-B4
Uranyl nitrate	B4
Urethane	B4
Benzone/Benzoin	A4
Bromine	A3
Cadmium chloride	A4/Sol. C4
Cadmium metal	B4
Cadmium sulfate	A4
Chromic acid/chromium trioxide	A4
Cyclohexane	B4
Formaldehyde	A4
Formalin	B4
Hematoxylin	B4
Hydrogen sulfide	B4
Hydroquinone	B4
Iso-amyl (or pentyl) alcohol	B4
Mercuric iodide Red Powder	A4/Sol.B4
Mercuric nitrate Cryst.	A4/.02M A4/.1M B4
Mercuric oxide	A4
Mercuric sulfate	A4
Mercurous chloride	A4
Mercurous nitrate	A3
Methyl ethyl ketone	B4
Pentane	B4
1-Phenyl-2-thiourea	B4
Phenylthiocarbamide	B4
Potassium periodate	B4
Sodium chlorate	B4
Trichloroethylene	B4
Urethane	B4
Xylene	B4

Prohibited Chemicals:

The following prohibited chemicals are based on lists 1 and 2 of the National Institute for Occupational Safety and Health (NIOSH) and the Florida Department of Environmental Protection (FDEP). Hazards include toxicity, carcinogenicity, teratogenicity, flammability, and explosive propensity.

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*No compressed gasses

A

Acetaldehyde
Acetyl Chloride
Acid Green
Acrylonitrile
Acrylaldehyde
Acrylamide
Acrylic Acid
Adrenaline
Ammonium bicarbonate
Ammonium bifluoride
Ammonium chromate
Ammonium dichromate
Ammonium oxalate
Ammonium perchlorate
Ammonium vanadate
Aniline
Aniline Hydrochloride
Antimony oxide
Antimony potassium tartrate
Antimony trichloride
Arsenic
Arsenic chloride
Arsenic oxide
Arsenic pentoxide
Arsenic trichloride
Arsenic trioxide
Asbestos
Ascarite

B

Barium oxalate
Benzene
Benzidine
Benzone
Benzonitrile
Benzoyl Chloride
Benzoyl peroxide
Beryllium
Beryllium carbonate
Bonine fluid
Bromine (concentrated gas)
Bromobenzene

C

Cadmium chloride
Cadmium nitrate
Cadmium Metal
Cadmium sulfate
Calcium cyanide
Calcium fluoride
Calcium phosphide
Carbon disulfide
Carbon tetrachloride
Carmine
Catechol
Chlorine
Chloral hydrate
Chloretone
Chlorobenzene
Chloroethanol
Chlorophenol
Chloroform
Chloropromazine
Chlorosulfonic acid
Chromic acid
Chromium
Chromium acetate
Chromium oxide
Chromium potassium
Chromium trioxide
Cobalt Metal
Colchicine
Copper Cyanide
Cresol
Cumene
Cyclohexane
Cyclohexene

D

Dichlorobenzene
Dichlorethane
Diethylamine
Dimethylanaline
2,4-Dinitrophenol
Diisopropyl ether
p-Dioxane
Diphenyl ester carbonic acid

E

Ethyl chloride
Ethyl ether
Ethyl iodide
Ethyl nitrate
Ethylenediamine
Ethylene dichloride
Ethylene oxide

F

Formaldehyde
Formalin
Fuchsin

G

Gasoline
Gunpowder

H

Hematoxylin
Hexanes
Hexane(cyclo)
Hexachlorophene
Hydriodic acid
Hydrobromic acid
Hydrofluoric acid
Hydrogen
Hydrogen fluoride
Hydrogen sulfide
Hydroquinone

I

Indigo carmine
Iso-amyl alcohol
Iso-butyl alcohol
Iso-pentyl alcohol

L

Lead powder
Lead arsenate
Lead carbonate
Lead(VI) chromate
Lithium metal
Lithium aluminum hydride

M

Magnesium metal (powder)
Magnesium chlorate
Mercury
Mercuric bichloride
Mercuric iodide
Mercuric chloride
Mercuric nitrate
Mercuric oxide
Mercuric sulfate
Mercuric sulfide
Mercurous chloride
Mercurous nitrate
Mercurous Oxide
Mesitylene
Methylamine
Methyl iodide
Methy methacrylate
Methyl oleate
Methyl orange
Methyl red

N

Naphthylamine, a-

Nickel metal
Nickel carbonate
Nickel oxide
Nickelous acetate
Nicotine
Nitriloacetic acid
Nitrobenzene
O
Osmium teroxide
P
Paradichlorobenzene
Paraformaldehyde
Paris green
Pentane
Perchloric acid
Phenol
1-phenyl-2-thiourea
Phenylthiocarbamide
Phosphouus, red, white, yellow
Phosporus pentoxide
Phthalic anhydride
Picric acid
Potassium metal
Potassium chlorate
Potassium chromate
Potassium cyanide
Potassium oxalate
Potassium periodate
Potassium permanganate
Potassium perchlorate
Potassium peroxide
Potassium sulfide
Pridine
Pyrogallic acid
S
Saccharine, pure
Salol
Selenium
Silver cyanide
Silver oxide
Sodium arsenate
Sodium arsenite
Sodium azide
Sodium bromate
Sodium borohydride
Sodium chlorate
Sodium chromate
Sodium cyanide
Sodium dichromate
Sodium ferrocyanide
Sodium fluoride
Sodium nitrate
Sodium nitrite
Sodium oxalate
Sodium perchlorate
Sodium peroxide
Sodium silicofluoride
Sodium sulfide
Sodium thiocyanate
Stannic chloride
Stearic acid
Strontium
Sudan III
Sudan IV
Sulfamathazine
Sulfuric acid, fuming
T
Talc
Tannic acid
Testosterone
Tetrabromoethane
Tetrahydrofuran (THF)
Thallium
Thermite and compounds
Thioacetamide
Thiourea
Titanium trichloride
Toluene
o-Toluidine
Trichloroethane
Trichloroethylene
Triethylamine
Trinitrobenzene
U
Uranium
Uranyl acetate
Uranyl nitrate
Urethane
V
Vanadium pentoxide
Vinylite

W
Wood's Metal
X
Xylene

All alkali metals, radioactive chemicals, azides, acetylides, styphnates, and cyanides

NO MERCURY **is allowed in the State of Florida schools or classrooms. This includes mercury thermometers, or any device that contains mercury.**

E. Reagent Concentrations and Alternate Reagents:

In many instances, the concentration of chemicals determines the degree of toxicity and irritation. Commercially prepared dilute solutions provide for a safe way of obtaining the necessary reagents with minimal hazard involved. The following list of chemicals should be ordered as dilute solutions for use in secondary schools only:

Barium nitrate
Lead nitrate
Silver nitrate
Cobalt nitrate
Strontium nitrate

F. LABELS & MATERIAL SAFETY DATA SHEET

A Material Safety Data Sheet (MSDS) is a document that contains comprehensive information regarding the physical and chemicals characteristics of the substance and is prepared by the manufacturer and/or supplier. MSDSs contain hazard evaluations on the use, storage, handling, and emergency procedures all related to that material. The MSDS is designed to contain more complete information about the material than the label. Every MSDS is intended to tell what the hazards of the product are, how to use the product safely, what to expect if the recommendations are not followed, what to do if an accident occurs, how to recognize symptoms of overexposure, and what to do if such incidents occur.

With respect to labels and Material Safety Data Sheets, the Chemical Hygiene Officer or lead Science Teacher is responsible to:

- Require labels on all containers of hazardous chemicals
- Maintain MSDS's received with incoming shipments of hazardous chemicals; and
- Ensure all MSDS's are readily accessible to laboratory workers.

It is the ***responsibility of the Science Teacher*** to know what substances are used in every school experiment, to review the MSDS for each substance, and to provide the MSDS to their students for review before students work with those chemicals.

It is the ***responsibility of the students*** to read and understand the MSDSs for every chemical before using them during a lab activity.

All Material Safety Data Sheets must be available in each chemistry laboratory classroom. The Plant Manager /Head Custodian should also maintain a copy of all MSDSs for all chemicals used or maintained in the school to include cleaning solutions found in custodial closets. The MSDSs can be sorted by lab exercises, so all of the MSDSs for materials used in that particular lab can be grouped together.

NOTE: The format of the MSDS will be changing to a standardized Safety Data Sheet (SDS). More information on the SDS may be found at: https://www.osha.gov/Publications/OSHA3642.html

G. Laboratory Information and Training Program

The aim of a laboratory Information & Training Program is to assure that all individuals at risk of chemical exposure in the laboratory are adequately informed about the chemicals they work with in the laboratory, risks involved with these chemicals and what to do if an accident occurs. With regards to emergency and PPE training, every laboratory worker should know the location and proper us of available protective apparel and equipment as well as emergency protocol required during a spill or release incident. All Science Teachers should be trained in the proper use of emergency equipment, spill/release procedures as well as first aid instruction.

A full Chemical Hygiene template and information may be found at:
http://www.fldoe.org/edfacil/sc3/safetyplan.asp

VIII. Specific Laws, Regulations, and Guidelines

A. Microwave Ovens: A Microwave oven is a dangerous example of laboratory equipment. Since their use in the science laboratory has gained popularity, there have been several nation-wide cases of laboratory fires that have occurred when improper or inappropriate materials were placed in these machines. In some cases, teachers were causing the fires accidentally. However, in most cases, students were placing gum foil, tin foil w/paper or cigarette packs in the oven, turning it on, and leaving the room (unsupervised laboratories or substitute days, etc.). Most of these combinations resulted in fires and school evacuation - costing the school and the city great sums of money for fire departments and evacuation procedures. Other activities resulted in ruined equipment (exploding pens, melted rubber, etc.) and in some cases dangerous explosions were documented (exploding cigarette/butane lighters). In all, multiple occurrences were recorded.

Placement of a microwave oven in a classroom constitutes a foreseeable attractive nuisance. It is strongly recommended that microwave ovens not be available to students during regular classroom time.

HOWEVER: They may be used for demonstration purposes tied to the curriculum, much like any other piece of dangerous equipment. In these cases, all lab procedures must be followed (safety goggles, no horseplay, etc.) and when the activity is done, the microwave is returned to the storage area.

B. Model Rocketry: Model rocketry provides an amazingly effective means of teaching the basic principles of physics and aerodynamics. Students are motivated to learn through the hands-on experience of building and launching their own rockets. Scientific concepts such as inertia, momentum, acceleration, applied forces, center of gravity, center of pressure, stability, and aerodynamics of flying objects are successfully taught, applied and reinforced through rocketry.

1. Model rockets may only be constructed from lightweight materials such as wood, paper, plastic, or without any metal used as structural parts.

2. Model rockets must be between ten to fifteen inches in height and must not weigh more than 1500 grams at lift-off. Engines may not contain more than 62.5 (as regulated by CFR.55.141) grams of propellant. The manufacturer must recommend model rocket engines for that rocket. Rocket engines must comply with the manufacturer's recommended maximum lift-off weight.

3. Only pre-loaded, factory-made, National Association of Rocketry (NAR) certified model rocket engines will be used in accordance with manufacturer recommendations. Rocket engines may not be dismantled or reloaded.

The 101.25 Federal Aviation Association (FAA) regulations require schools to notify FAA concerning model rocket launches that do not conform to the above listed specifications.

4. The following launch specifications are required for all school based model rockets:
    - Launch systems must be remotely controlled from a safe distance and electrically operated.
    - Launch systems must contain a launching switch that will return to the off position when released.
    - Launch systems must have a removable safety lock or removable key.
    - All persons must remain at least 30 feet away from any model rocket when igniting engines.
    - Only electrical igniters may be used. These must ignite the rocket engine within one second of actuation of the launching switch.

5. Model rockets may not carry live animals or payloads that are intended to be flammable or explosive.

6. Rockets must be launched outdoors in a cleared area, free of trees, power lines and buildings.

7. The following launch safety specifications must be met for all school based model rockets:
    - Rockets must be launched from a rod or other device that provides rigid guidance until the rocket has reached a speed adequate to ensure a safe flight path.
    - To prevent accidental eye injury, the launch rod must be above eye level or be capped when approached.
    - The launch rod must be capped when disassembled and never stored in an upright position.
    - The launch device must have a jet deflector to prevent the engine exhaust from hitting the ground directly.
    - The area around the launch device must be cleared of brown grass, dry weeds and other easy to burn materials.
    - An ABC type fire extinguisher must be within close proximity to the launch site.
    - All launches must be supervised by an SBBC employee/teacher.

8. No one may approach a model rocket on a launcher until the safety has been removed or the battery has been disconnected. If a misfire occurs, one full minute should be allotted before approaching the launcher.

9. No model rocket may be launched within five miles of the boundary of any airport, or within 1500 feet of any person or property that is not associated with the school board.

10. Model rockets must not be launched so their flight path will carry them against targets. The launch device must be pointed within 30 degrees of vertical. Model rocket engines must never be used to propel any device horizontally.

11. A recovery system must be used in model rockets that will return them safely to the ground so that they may be flown again. Only flame-resistant recovery wadding should be used in the recovery system. No attempt should be made to recover rockets entangled in power lines.

12. A maximum of 1,500 grams of propellant may be stored within the school storage facility. All rocket propellants must be stored in the flammable storage cabinet within the chemical storage rooms. Rocket engines may not be stored in the classroom.

C. Animals in the Classroom: Care, Handling, Precautions and Dissections.

1. **Approved Animals for Classroom Use:** Some animals are allowed in the science classroom. However, all animals represent a high level of safety concern since their behavior is often unpredictable. Additionally, many animals carry pathogens or allergens that may impact the student population. These considerations must be addressed prior to any animal being placed in the student area. For this reason, it is recommended that both parent and principal permission are required before an animal may be placed in the classroom.

It is further recommended that all animals must be tied directly to the curriculum. For example, fish in a marine science lab have a direct connection to the content. Students will participate in the development and maintenance of the aquarium, and the content is enhanced by the placement of these tanks in the classroom. However, a hamster in a physical science class has no direct instructional relationship and is not appropriate for this classroom. In the elementary setting, these same guidelines apply. A hamster in an elementary classroom is only appropriate if instruction is enhanced by its placement in the classroom. Students can learn a great deal about animal behavior, nourishment, life patterns, and environmental considerations by observing animals.

Due to the threat of Salmonella, all reptiles should have a veterinary certificate on file declaring these animals' safe and pathogen free. Snakes, turtles and iguanas may require a veterinary certificate prior to their placement in a student area. Stray animals (birds, frogs, turtles, snakes, etc.) are forbidden unless proper veterinary documentation is obtained.

Additionally, **it is recommended that pets are NEVER to be brought in to school** (for show-and-tell or any reason). These are not controlled situations and open students to dangerous animal interactions. Students found bringing a pet to school must be sent home with their animal. These animals are not allowed in the school.

If you wish to provide animal access to your students, you must meet these 5 requirements:

- Parent permission is obtained for all students who may come in contact with, or be in the same location as the animal(s).
- Curriculum is tied directly to the animal(s).
- Principal permission is obtained. The principal has the right to deny animal placement in any classroom.
- Safety contracts are on file for each student, and student/animal interaction is addressed in each safety contract.
- Animals are healthy and those animals that may carry pathogens have been declared pathogen free by a veterinary examination.

2. **Animal Care and Handling:**

The care and well-being of animals studied in the classroom should be of major importance to the science teacher and student. The science teacher is ultimately responsible for all animals kept in the classroom. Students may participate in maintaining a schedule for feeding animals, cleaning their cages, supplying water, and maintaining appropriate temperature. The teacher must supervise all student involvement. Due to the concern for allergies, parent permission is strongly recommended.

Before using animals, teachers establish guidelines to avoid any intentional or unintentional abuse, mistreatment, or neglect of animals and to promote humane care and proper animal husbandry practices. Whenever animals are to be used in science activities with students, it is imperative that care be exercised to protect both the animals and the students. If animals are to be kept at any time in the room in cages, be certain that adequately sized and clean cages are provided to all animals. Keep cages locked and in safe, comfortable settings.

Animals can stimulate and enhance learning and should be used safely in the laboratory/classroom. Because increased activity and sudden movements can make animals feel threatened, ALL student contact with animals should be highly organized and supervised. Teachers should keep the following precautions in mind to ensure an enjoyable and comfortable experience for their students:

- Inquire beforehand about student allergies associated with animals.
- Animals must be hardy and able to thrive in captivity.
- Animals must have natural habitats that can be easily replicated.
- Incompatible animals may never be housed in the same cage.
- Animal quarters must be kept clean, protected from the elements, and have enough space for normal activity.
- The quantity and type of food must meet the animal's nutritional requirements.
- Temperature, lighting and other environmental features must be appropriate for the type of animal being housed.

- Precautions must be taken to prevent unauthorized students from harassing or injuring the animal or themselves.
- Careful monitoring of the animal's health is required and a licensed veterinarian, if it becomes necessary, must carry out euthanasia.
- Students must be thoroughly instructed in the care and handling of animals before access to any animal is permitted. Safety contracts must outline these instructions.
- Students must wear heavy cotton work gloves when handling animals that may bite and students must wash their hands after handling animals.
- Never allow students to tease animals or touch animals to their mouths.
- Animals must be handled in the manner and extent indigenous to the species.
- Students must report all bites or scratches to the teacher.
- Provisions must be made for animal care over weekends and holidays.
- After the study of animals is completed, they should be returned unharmed to their natural environment.
- Wounded or stray animals must not be brought to the school.
- Snakes that feed on other animals must not be fed in the presence of children.
- Never dispose of fecal matter in sinks or with commonly used equipment.
- Fish tanks must be constructed of a shatterproof/tempered glass. Plate glass tanks may not be used as fish tanks.
- Fish tanks must not be placed in locations that compromise electrical safety. Filters, hoses and water outlets must not be located near electrical outlets unless the outlet is rated Ground Fault Interrupt (GFI). The OSHA standard suggests keeping all water/tanks at a distance of 3 feet or more from a non-GFI electrical outlet.
- Poisonous fish, insects or animals are all forbidden, and aggressive carnivorous fish (Piranha, Oscar, etc.) are forbidden.
- The principal of a school has the right to add additional restrictions and provisions for animal care and handling.

3. **Animal Dissection**

This policy is in accordance with the National Science Teachers Association, 2000.

- **RECOMMENDATION:** Teachers using dissection as a method of instruction should be able to state sound educational goals and objectives for the dissection. Appropriate pre-dissection discussion and instruction, dissection directions and guidance, and post dissection activities should be planned and implemented for each lab. Teachers should be prepared to discuss the structural significance of the species being studied in relation to humans and other organisms. As with all instruction, the use of animal dissection in the curriculum should be well-planned and educationally sound.
- **STATUTE:** Alternative instructional activities will be provided **at all levels** for those students who refuse or are unable to participate in dissection labs, as per Florida Statute 233.0674.

Recommended State Guidelines for Dissections in Science Classrooms:

- No animal dissections of any kind should be done in grades K-5.
- Consistent with the intent of F. S. 232.45 safety goggles must be worn by all students involved in dissection.
- Vinyl, latex, polyethylene, or polyvinyl disposable gloves will be used during dissection.
- The specimen's taxonomic order and cost should be commensurate with the level, nature, and performance standards of the course.
- Dry pack, alcohol packed, formaldehyde alternative or glycerin-preserved specimens will be purchased only.
- All used dissection specimens will be wrapped in strong plastic bags and placed in a waste receptacle for disposal.
- Only preserved specimens obtained from an approved commercial vendor may be used for dissection. Purchasing animals (chicken, fish, squid, etc.) or animal parts (hearts, eyeballs, etc.) from a grocery store for the purpose of dissection is prohibited.
- Alternative instructional activities will be provided at all levels for those students who refuse or are unable to participate in dissection labs, as per Florida Statute 233.0674.

D. Plants in the Classroom

While plants produce the oxygen necessary for animal life, provide us with food, and beautify our surroundings, some produce very toxic substances. Teachers should familiarize themselves thoroughly with any plants they plan to use in the classroom.

1. Plant Selection: It is important to realize that plants may carry allergens and are, in some cases, poisonous. For this reason, parent permission is required prior to plants being placed in the classroom. Parents must always be aware of the types of plants or animals their children may come in contact with throughout their educational day. In all cases, poisonous plants are forbidden.

Utilize the following policy guidelines for proper selection, care, handling and use of plants in the laboratory:

- Inquire beforehand about student allergies associated with plants. Parent permission is required.
- Never use poisonous or allergy-causing plants in the classroom.
- Never burn plants that might contain allergy-causing oils, e.g., poison ivy or peanuts.
- Make a clear distinction between edible and non-edible plants.
- Never allow plants to be tasted.
- Have students use gloves while handling plants and wash hands afterwards.
- Alcohol should be substituted for chloroform in chlorophyll extractions**.**

2. Butterfly gardens:
It is recommended that schools are aware that some plants used in a butterfly garden can be toxic to humans. For example, the milky sap of the milkweed plant can be dangerous if contact is made with the eye. The sap can also cause irritation on the skin. It is recommended that if there is a question on the safety of the species of plants being considered for the garden, that council is sought with a local agricultural agency.

IX. Field Trip Safety Considerations

In many science curriculum areas, field trips play an important part in enhancing or augmenting textbook information. The science teacher should be aware of possible safety hazards and precautions to be taken when taking students on a field trip. The following list emphasizes several pre-field trip considerations:

- Have parent consent slips and field trip forms signed.
- Keep all students under your direct supervision at all times.
- If plants are to be encountered, ascertain if any student is allergic to a particular type of species.
- If the possibility of insect bites is likely, determine if any may be allergic.
- Determine if any student is limited in his/her physical activity and make appropriate preparations.
- If the field trip involves outdoor exploration, indicate appropriate clothing, sun protection, foul weather gear, and insect protection.
- Insure that adequate numbers of male and female chaperones are present.
- Carry a first aid kit.
- Bring appropriate safety equipment for hazardous procedures (i.e. goggles for chipping rocks).
- Warn students about eating wild fruits or drinking water from lakes or ponds.
- Warn students about putting their hands into any unexposed areas; that is, under bushes, in holes, under rocks or logs.
- Travel the route in advance and examine the site to insure adequate time for the activity.
- Advise students about appropriate behavior on buses and at the site.
- Instruct students to report to a designated emergency location if any difficulty arises.
- Establish a buddy system so that students are never alone.
- Take attendance periodically.
- Wear gloves while handling any field specimens.
- Remind students to report any accident or mishap to the teacher immediately; check students for unreported injuries.
- Never enter any caves or caverns unless accompanied by an experienced guide.

X. Prohibited Practices

The following procedures are prohibited in Florida Public Schools.

- Draw or analyze human blood, urine or other body fluids, because of the possibility of AIDS.
- Scrape cheek cells for microscopic analysis because of the possibility of infection or AIDS.
- Heat glassware that is not labeled Kimax or Pyrex since it may shatter.
- Handle, inhale, or use equipment containing mercury in the school since mercury poisoning may occur even with low level contamination.
- Use alcohol burners or propane tanks because of their high flammability. Gas burners and hot plates are the only allowed sources of heat.
- Use PTC (phenylthiocarbamide) taste paper because it is a rodenticide and not approved by the Federal Drug Administration (FDA) for human consumption.
- Order animals preserved in formaldehyde or formalin. These chemicals cause respiratory and skin irritation and are suspected carcinogens. Order dry-packed specimens or specimens preserved in glycerin only.
- Place living specimens in formalin or formaldehyde.
- Allow reptiles or amphibians in the classroom (without proper veterinary documentation) since they may carry Salmonella, a dangerous bacterium.
- Look directly at burning magnesium metal since the bright light may damage the eyes.
- Purchase or use hypodermic needles.
- Demonstrate the thermite reaction since the heat produced is difficult to control and using magnesium is hazardous.
- Stare directly into a laser beam because of the possible retinal damage that might occur.

XI. Contact Information:

State:

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