St. Lucie PUBLIC SCHOOLS

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

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9461 Brandywine Lane

Port St. Lucie, FL 34986

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Introduction

Science activities, including hands-on investigations, explorations, and demonstrations are essential for high-quality K–12 science instruction and occur in various locations both inside and outside schools, including science classrooms, laboratories, or the field (Bass, Yumol, and Hazer2011). These activities build student knowledge and skills in science and address the nation's critical need for high-quality education in science, technology, engineering, and mathematics (STEM) subjects. Inherent in conducting science activities, however, is the potential for injury.

The National Science Teachers Association (NSTA) encourages K–12 school leaders and teachers to promote and support the use of science activities in science instruction and work to avoid and reduce injury. A science program that includes many laboratory and hands-on activities inherently requires a comprehensive safety program. The purpose of this document is to articulate and promote safe practices in the science classroom. This will ensure that lab experiences at all grade levels are both educational and safe.

NSTA recommends science educators—including those at the elementary level—adhere to the better professional practices and legal safety standards listed below and be proactive in ensuring that school and school district leaders know and are adhering to these safety expectations.

This manual provides current safety information about materials, equipment, activities, organisms, chemical substances, and practices in all science classrooms. This publication also reflects the St. Lucie Public Schools' commitment to hands-on learning activities as an integral part of science instruction. The intent of this manual is to advocate hands-on classroom instruction in a safe and appropriate manner.

It is of paramount importance that the teacher understands the absolute necessity of being fully prepared to manage laboratory activities with safety as the very highest priority.

NSTA recommends teachers and school leaders visit the NSTA Safety Portal for up-to-date information on safety issues and guidelines.

NSTA Position Statement, Safety & School Science Instruction
https://www.nsta.org/about/positions/safety.aspx

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/educational benefits associated with this activity?
- What are its worst-case possible outcomes?
- What actions do I need to prepare to take if these outcomes should occur?
- What practices, equipment, and facilities would reduce risks?
- What specific training, techniques, information, and safety instructions must be taught to students prior to the laboratory experience?

Teacher Responsibility

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. Teachers must emphasize safety techniques that pertain to specific laboratory activities at the time these events occur. The science instructor should always be aware of all possible safety hazards and conditions associated with an activity. Laboratory exercises should be modified--or even terminated--and students reminded of proper lab procedure every time a potentially hazardous situation is encountered.

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

- Make the safety practices a major emphasis in the science curriculum.
- Provide the SLPS Student Science Safety Acknowledgement Form 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.
- Instruct students in proper evacuation procedures in the case of an emergency.
- Point out specific safety considerations in a particular lab activity.
- Explain the proper handling, dispensing and disposal procedures for chemicals, including the possible hazards associated with each substance.
- Never leave students alone and/or unsupervised in the lab.
- Remind students that they are not allowed in chemical storerooms or lab preparation areas.
- Prohibit students from bringing any food or drink into the lab.
- Discuss the laboratory activity with students prior to experimentation so that safety situations and possible hazards can be clarified. Explain the consequences for violating safety regulations.
- Notify the administration, in writing, of any possible safety hazard that exists in the laboratory.

- Provide immediate and prudent care in case of an accident to prevent additional complications from arising. Contact your administration and call 911 immediately if appropriate.
- Science fair projects should be scrutinized for safety hazards and corrected before teacher approval is given. The science teacher is ultimately responsible for all assigned science activities.

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.
- Never run or horseplay in the lab.

Students must abide by a student safety acknowledgement form to be distributed by the teacher and signed by the student and the student's parent or guardian. Forms must be collected and kept on file with each science instructor.

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 acknowledgement form.
- 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.

Safety Acknowledgement Form

The Safety Acknowledgement Form outlines the responsibilities of students and is acknowledged by the parent. A copy of the signed form is to be kept on file with the teacher. Students who do not return a signed copy are not permitted to conduct laboratory exercises until a form is returned. The St. Lucie Public Schools Science Safety Acknowledgement Forms are provided on the next pages.

St. Lucie Public Schools K-5 Student Science Safety Acknowledgement Form

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 tie back long hair.
- 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 not run or participate in horseplay in the lab or classroom.
- I will wear gloves when handling animals or as directed by the teacher.
- I am allowed to participate in activities with butterflies or other arthropods to study complete and incomplete metamorphosis.
- I am allowed to participate in activities involving plants and their parts.

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

St. Lucie Public Schools 6-12 Student Science Safety Acknowledgement Form

Note to parents/guardians: Please review the following safety acknowledgment with your child and sign in the spaces indicated. If you or your child have any questions, please contact your child's teacher or school administrators.

What I need to do to behave responsibly:

- Always follow safety operating procedures.
- Always wait for the teacher's directions before touching any lab materials.
- Listen to and follow all instructions given by the teacher.
- Tell the teacher if you see anything that might not be safe, including unsafe behavior.
- Behave in a responsible manner in the science classroom and in outdoor settings.
- Report any accidents, spills, or broken equipment to the teacher immediately.
- Read and follow all warning labels on substances being used.
- Be sure your teacher is aware of any allergies you may have.

What I need to do for my safety:

- Wear personal safety equipment (goggles, gloves, aprons) as indicated by your teacher.
- Tie back long hair.
- Avoid wearing loose sleeves or other clothing that may drag in chemicals or catch on equipment.
- Do not wear loose hanging jewelry, especially when working with chemicals or heat sources.
- Before touching a hot plate or other heat source, make sure that it is both unplugged and cool.
- Never taste, eat, or drink anything in science class.
- Avoid touching your eyes, ears, face, or mouth when working with chemicals, plants, or animals.
- Never mishandle or mistreat animals.
- Make sure any chemical used has a label on the container.
- Keep lids on bottles and other containers when not in use.
- Dispose of all chemical waste and materials only as directed by my teacher.
- Never smell or inhale anything unless the teacher tells you to do so.

What I also need to do:

- Use science equipment the way you have been taught.
- Do not pull out electric plugs by tugging on the cord.
- Keep your workplace neat and clean up when the activity is completed
- Keep books, book bags, etc., off the floor and away from the area where the science activity is being performed.
- Know the location of all safety equipment, such as the fire blanket, fire extinguisher, first-aid kit, etc., in or near your classroom/laboratory.
- Wash your hands with soap and water after science lab activities

Agreement: I have read and understand this form. I was present when these safety guidelines were discussed in class or I discussed them directly with my teacher. I am aware that the laboratory may have hazards that could make it unsafe. I acknowledge that it is important that I follow the above safety procedures to help make it a safer learning environment.

Student Signature: _____ Date: _____

I have read and reviewed the lab safety rules with my child.

Parent/Guardian Signature: _____ Date: _____

Reporting Injuries and Emergencies

The most important functions of a teacher in preventing accidents are the effective management of instructional activities and the proper supervision of all students. Even under the best conditions, accidents and emergencies may occur. Prompt, calm, and professional handling of emergencies is imperative. The safety of students and teachers is the primary concern.

- The teacher should be familiar with district and building emergency procedures.
- Teachers are to follow district and school policies concerning completing incident reports.
- Always notify an administrator when a laboratory accident occurs.
- Whenever there is a life-threatening emergency, dial 9-1-1.
- All students requiring first aid should be sent to the clinic.

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 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

Facilities Safety Requirements:

It is the responsibility of the school to provide all science classrooms with proper safety equipment. Students should know the location and use of safety equipment. Good laboratory practice requires regular inspection of the equipment by the teacher to ensure the equipment is in good working order.

Rooms used for laboratory investigations should be equipped with the following items:

- ABC type fire extinguisher
- Broom and dustpan
- Chemical spill materials
- Containers for broken glassware
- Clearly labeled chemical wastes storage area to be determined by Department Chair.
- Deluge shower
- Emergency exhaust fan separate from the regular air system
- Emergency lighting
- Eye wash station
- Fire blanket
- Ground fault interrupter circuit (GFI) for electrical outlets in proximity of water splash areas
- Master electrical cut-off switch, readily accessible and clearly labeled
- Master gas cut-off switch, readily accessible and clearly labeled (if applicable)
- Signs clearly marking all safety equipment, hazardous areas and fire exits
- Fume hood with a spark proof motor (if applicable)
- Sanitizing cabinet for safety glasses (Z87+) and safety goggles (Z87+).

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.

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.

- **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.**
- 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.
- 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.

Science Classrooms, Labs or Shops:

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

Storage:

- 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.
- 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.
- 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.*

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.

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.
- Fire Alarms and Heat/Smoke Detectors: Fire alarms and heat or smoke detectors are maintained in an operational condition at all times.
- Explosion-proof detectors are installed in flammable storage rooms.
- 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.
    - 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.

Safe Laboratory Attire

To promote safety in the school laboratory, students, teachers, and visitors should dress in a manner that will reduce the likelihood of an accident or injury.

Aprons
Chemical resistant laboratory aprons should be provided to protect clothing and underlying skin from chemical spills and splattering. Disposable aprons may not be chemically resistant. Aprons should be wiped down with disinfectant after use.

Gloves
Due to the nature of the science classroom, there will be times when gloves are necessary for the safety of students and teachers. Care should be taken to ensure that the proper glove is being used for its intended purpose. Teachers should be aware of the growing problem of allergic reactions to latex gloves and the powder on these gloves. These allergies can range from mild to severe, including anaphylactic shock. Students may not be aware that they are allergic to Latex until exposed. Continued exposure to latex increases the severity of the reaction; if a student is allergic to latex, alternative gloves should be available and provided to the entire class. These options include:

- PVC- Also known as vinyl, these gloves can be used for experiments dealing with acids and alcohols, but not petroleum solvents.
- Nitrile- A synthetic rubber with superior puncture and abrasion resistance in addition to chemical protection.

For working with heated objects, students should have access to heat resistant gloves. Heat resistant gloves should not be allowed to get wet as they will lose their heat resistance. Gloves of any type must be kept well away from open flames.

Shoes
Shoes that cover the entire foot must be worn to provide a protective barrier against broken glassware and chemical spills.

Clothing
Loose fitting clothing, floppy sleeves and accessories such as ties and scarves should not be worn to prevent contact with chemicals, machinery, and flames.

Contact lenses
Students should be made aware of the possible hazards associated with wearing contact lenses. Soft contact lenses have a potential of reacting with vapors produced during a lab. Both soft and hard contacts have a tendency to absorb and concentrate liquids and vapors behind the lens. Contacts also impair the cleansing of the eyes in case of a chemical splash. For these reasons the instructor must be notified if contacts are worn prior to conducting certain laboratory procedures.

Long hair
Long hair should be tied back so that it will not come in contact with chemicals, machinery, and flames.

Jewelry
Dangling jewelry should be removed.

Eye Protection:
Florida DOE require that goggles and safety glasses have an appropriate ANSI rating, safety glasses (Z87+) and safety splash goggles (Z87+).

- Provide adequate protection against the hazards for which it is designed
- Be reasonably comfortable under the conditions of use
- Fit securely without interfering with vision or movement
- Be durable
- Be kept clean and in good repair
- Goggles must be sanitized and cleaned before each use. Goggles may be sanitized by using a UV sanitizing cabinet or by dunking them into a bucket of disinfectant solution (20 mL of disinfectant/L of deionized water) and allowing them to air-dry.
- 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.
- 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.
- 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.

Hearing protection
Hearing protection should be worn during experiments in which the sound safety threshold may be exceeded. Exposure limits depends on both loudness and duration. Detailed information about sound exposure limits is available at OHSA.gov

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.

Laboratory Safety Equipment Checklist:

The teacher should check the operation and/or condition of the following at the beginning of each semester and the end of the school year for the purpose of initiating corrective actions or repairs. Science teachers should regularly check their instructional areas to assure that they are safe.

Concerns about safety conditions related to the facilities, equipment, supplies, curriculum, and classroom occupancy load should be communicated in writing immediately to the science department chairperson and/or site administrator for assistance in correcting the condition.

- 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.

Safety Checklist for Science Classrooms

The teacher should check the operation and/or condition of the following at the beginning of each semester and the end of the school year for the purpose of initiating corrective actions or repairs. Science teachers should regularly check their instructional areas to assure that they are safe.

Concerns about safety conditions related to the facilities, equipment, supplies, curriculum, and classroom occupancy load should be communicated in writing immediately to the science department chairperson and/or site administrator for assistance in correcting the condition.

Please return form to Science Department Chairperson or Facilities Site Administrator each time checklist is completed.

Y =Yes, working condition NP =Not Present

NW =Not Working AV =Available, when needed

Room Number:	**School Year:**		
Recommended in all Science Classrooms	**Date:**	**Date:**	**Date:**
Fire Extinguisher (ABC Type)			
Eye Wash			
Ground-fault circuit interrupters (GFI)			
Broom and dustpan			
Designated waste container for glass			
Exits marked and properly stored			
Equipment properly stored			
Chemicals properly labeled and stored			
Goggles (record number)			
Sanitizing equipment for goggles (record location)			
Lab aprons (record number)			
Access to Water			

Safety check completed by: _____

Safety Checklist for Secondary Science Laboratories

The teacher should check the operation and/or condition of the following at the beginning of each semester and the end of the school year for the purpose of initiating corrective actions or repairs. Science teachers should regularly check their instructional areas to assure that they are safe.

Concerns about safety conditions related to the facilities, equipment, supplies, curriculum, and classroom occupancy load should be communicated in writing immediately to the science department chairperson and/or site administrator for assistance in correcting the condition.

Please return form to Science Department Chairperson or Facilities Site Administrator each time checklist is completed.

Y =Yes, working condition **NP =Not Present**

NW =Not Working **AV =Available, when needed**

Room Number:	**School Year:**		
Recommended in all Secondary Science Laboratories	**Date:**	**Date:**	**Date:**
Fire Extinguisher (ABC Type)			
Fire Blanket			
Shower with drain			
Eye Wash			
Chemical Spill Materials			
Ventilation exhaust fan			
Fume Hood			
Gas master cut-off			
Electrical Master cut-off or posted location of master cut-off			
Ground-fault circuit interrupters (GFI)			
Broom and dustpan			
Designated waste container for glass			
Exits marked and readily accessible			
Equipment properly stored			
Chemicals properly labeled and stored			
Goggles (record number)			
Sanitizing equipment for goggles (record location)			
Face Shields (record number)			
Lab Aprons (record number)			
Chemically inert gloves (record number)			
Heat resistant gloves (record number)			
Adequate number of lab stations to accommodate class load			
Access to water			

Safety check completed by: _____

Safety Concerns

Biotechnology and Microorganisms

Safety in a laboratory is important in the prevention of infection that might be caused by the microorganisms being studied. Many types of microorganisms are potentially pathogenic. This means that, although they would not cause disease in a normal healthy host, they might possibly do so if a large enough quantity of the microbes came into contact with a compromised host, for example, through wounds and cuts. Since local, state and federal regulations and statutes are constantly being updated regarding microbiology protocols, it is recommended that only well-trained educators should engage in microbiological experiments. Deoxyribonucleic acid (DNA) is at the core of many hands–on activities in molecular biology and biotechnology exercises introduced in high school. This study involves isolation, enzymatic digestion, gel electrophoresis, and manipulation of bacterial cells to introduce new genetic information. All research involving recombinant DNA technology must be carried out in accordance with the National Institutes of Health (NIH) (NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines) - November 2013) guidelines for conducting research using recombinant DNA. Essential guidelines for handling any microorganism or DNA in the laboratory are also contained in the Standards for Microbial Practice section of the manual, Biosafety in Microbiological and Biomedical Laboratories, Biosafety in Microbiological and Biomedical Laboratories—6th Edition (cdc.gov)

Guidelines

The guidelines below summarize the procedures for working with biotechnology and microorganisms to ensure that the activities will be performed safely. The following are precautions that should be taken:

1. Known pathogens must never be used for class study, and special care must be taken to avoid contamination of laboratory and stock cultures.
2. There must be no eating or drinking in the microbiology laboratory. Food or drink should never be stored in refrigerators containing laboratory materials. All potential infectious vectors, such as fingers and writing instruments, must be kept away from the body's entry points including such as eyes, nose, and mouth.
3. Students and teachers must wear protective eyewear, gloves and laboratory apron/coat. These should be decontaminated after each use.
4. When working with microorganisms and recombinant DNA, keep hands must be kept away from the mouth, nose and eyes, as well as any other entry point such as wounds. Washing the hands thoroughly with soap and water before and at the end of every laboratory period is mandatory.
5. All microorganisms and DNA samples must be treated as if they are potential pathogens, and thus handled accordingly.
6. Use either a 10% bleach solution or a 70% alcohol solution to wipe down benches and work areas both before and after working with cultures and after a spill.
7. If bacterial cultures are accidentally spilled, the area should be disinfected with a 10% bleach solution or a 70% alcohol solution.
8. Decontaminating solutions should be readily available and contained in well-labeled laboratory squeeze bottles.
9. Solutions should never be pipetted by mouth. Use only mechanical pipetting devices for transferring any material.

10. Perform procedures carefully to minimize the formation of aerosols. Inhalation of infectious aerosols is by far the most frequent mode of laboratory infection. Any actions that might result in the generation of an aerosol must be avoided. (e.g., shaking an inoculating loop or agitating media).
11. Sterilize:
    a. all exposed materials such as media, tubes, plates, loops, needles, pipettes, and other glassware used for culturing microorganisms or isolating DNA and restriction enzymes by autoclaving.
    b. all cultures and their containers via autoclaving before disposal. Plastic petri dishes should be autoclaved for 20 minutes at 1210C and disposed without opening or submerged and opened in a 10% bleach solution and left for 30 minutes.
    c. wire inoculating loops and needles must using a flame until the wire glows red-hot, both before and after use.
12. All cultures and media should be clearly and securely labeled with names and dates. Culture dishes, once inoculated, should be sealed with tape and not reopened.
13. There is always a chance that microorganisms obtained from the environment may be pathogenic, so the culture dishes should be sealed with tape and not reopened. No transfers are to be made to other culture dishes.
14. Liquid and solid wastes that have been in contact with experimental organisms must be decontaminated. Experimental organisms must be destroyed before disposal.

The National Institutes of Health - Biosafety in Microbiological and Biomedical Laboratories has recommendations for BSL 1 organisms that may be suitable for use. Biosafety in Microbiological and Biomedical Laboratories—6th Edition (cdc.gov)

Chemicals

The science teacher is responsible for making sure that all chemicals are stored, labeled, handled (by both teacher and student), and disposed of appropriately. Use this section and the Approved Chemical List to determine appropriate use.

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 Safety Data Sheets (SDS) for each received chemical in a convenient location. Possible hazards in handling, storage, and disposal should be understood before the chemical is used. SDS sheets should be referenced for proper handling, storage and for appropriate personal protective equipment. If an SDS is not available, request one from the manufacturer or obtain on online at http://www.msdsonline.com.
- 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.

Chemical Labels

The label on a stock chemical is one of the most valuable sources of information. The United Nations has instituted a new system of classification and labeling of chemicals called the Globally Harmonized System (GHS). This universal system combines signal words, hazard statements, and pictograms to offer a more comprehensive look at safe chemical handling. A stock chemical label may supply the following information:

- Name of the chemical
- Chemical formula
- Degree of hazard
- Health and physical hazards

- Precautionary measure to prevent misuse
- First aid information
- NFPA hazard symbol
- Suggested storage on the label.
- Pictogram representing the degree of hazard

The degree of hazard is indicated by the use of appropriate signal words and pictograms, which call attention to the severity of the potential hazard of the chemical. The GHS signal words are:

Danger - high degree of hazard

Warning - intermediate degree of hazard

There are eight pictograms in GHS. The link below will take you to a Flinn Facts that shows an example of each pictogram with an example of a chemical that would be represented by the symbol.

Flinn Scientific: https://www.flinnsci.com/api/library/Download/64f79a1b4eb241e69fcf78d13476e8fc

Exposure to chemical substances can be hazardous to your health. The Occupational Safety and Health Administration (OSHA) has defined classes of health hazards. The definitions are at: https://www.osha.gov/dsg/hazcom/ghd053107.html

Chemical Storage

Chemicals should be stored according to compatibility on stable shelving with proper

ventilation. Teachers are responsible for returning chemicals to the proper location after use. 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.

Keep a current inventory of all chemicals. The inventory should include the following information:

- Chemical name
- Date purchased
- Storage pattern code (IN, OR, AC, FC)
- Quantity
- Hazard
- Purchase restrictions (if any)

Other storage considerations:

- Store chemicals in compatible families. **Do not store chemicals alphabetically!**
- The chemical storeroom must be locked at all times.
- Students should NOT have access to the chemical storeroom.
- An NFPA (or equivalent) label must be placed on all chemicals.
- All flammables (materials with an NFPA Flammability Rating 3 or 4) must be stored in a dedicated flammables cabinet.
- All inorganic and some organic acids should be stored in a dedicated acid cabinet.

- Isolate concentrated nitric acid from organic acids(such as Acetic Acid) in an isolation cube or in a Styrofoam shipping container. It may be stored on a storeroom shelf near the floor if organic acids are stored in the acid cabinet.
- Isolate ammonium nitrate in the solid form from all other chemicals.
- Chemicals must never be stored on the floor, even temporarily.
- Chemicals must never be stored on the top of a storage cabinet.
- Chemicals must never be stored above eye level.
- Shelf assemblies must be firmly attached to the wall.
- All shelving must have anti-roll-off one-half inch lips.
- All shelving units should be made of chemically resistant material.
- All chemicals ordered for AP/IB/AICE/second year courses/Science Research are to be labeled as such.
- Do not use the fume hood as a storage area.
- 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.

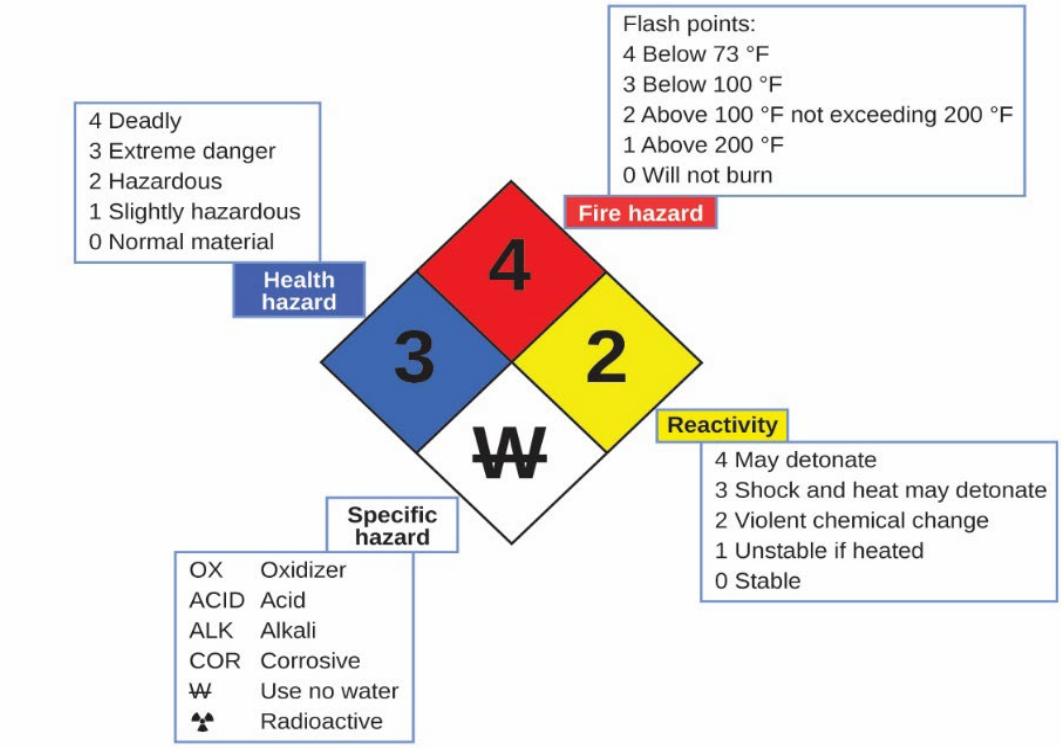
NFPA Labels

The National Fire Protection Association (NFPA) has established a labeling system that provides a quick and simple method of identifying the type and relative degree of chemical hazard. This system allows individual who are not familiar with the hazardous nature of chemicals a ready method of identification.

The NFPA label includes a diamond-shaped symbol into four color-coded areas (Health, Fire, Reactivity, and Special) that represent major areas of hazard. The degree of hazard in each area is represented by numbers (0 - none, 1 - minor, 2 - moderate, 3 - severe, 4 - extreme). The Special Hazards area is reserved for symbols that represent special handling and storage precautions that need to be observed.

NFPA Symbol

The NFPA label includes a diamond-shaped symbol and must be placed on every stock chemical once it is received by the Science Department.



NFPA Rating Explanation Guide

RATING NUMBER	HEALTH HAZARD	FLAMMABILITY HAZARD	INSTABILITY HAZARD
4	Can be lethal	Will vaporize and readily burn at normal temperatures	May explode at normal temperatures and pressures
3	Can cause serious or permanent injury	Can be ignited under almost all ambient temperatures	May explode at high temperature or shock
2	Can cause temporary incapacitation or residual injury	Must be heated or high ambient temperature to burn	Violent chemical change at high temperatures or pressures
1	Can cause significant irritation	Must be preheated before ignition can occur	Normally stable. High temperatures make unstable
0	No hazard	Will not burn	Stable

RATING SYMBOL	SPECIAL HAZARD
ALK	Alkaline
ACID	Acidic
COR	Corrosive
OX	Oxidizing
☢	Radioactive
W	Reacts violently or explosively with water
W OX	Reacts violently or explosively with water and oxidizing

LABELS & MATERIAL SAFETY DATA SHEET (MSDS/SDS)

When using any chemicals, teachers should comply with these items and should not use a chemical unless they have reviewed the label and MSDS/SDS and therefore:

- know in advance hazards presented by that chemical
- know in advance the precautions you must follow to minimize the probability of harm.
- are able to take those precautions
- have prepared in advance and are able to carry out the necessary first aid and emergency measures in the event something goes wrong.

The MSDS/SDS provides both useful and critical information on a substance which can help to ensure a safe science classroom environment. It is a teacher's professional obligation to become familiar with the MSDS/SDS for every chemical to be used in a lab or research project.

Each chemical storeroom should have a notebook with the MSDS for the chemicals in that storeroom. In addition, the administration is responsible for keeping MSDS for all of the chemicals used in the school.

The Material Safety Data Sheet/Safety Data Sheets (MSDS/SDS) is designed to provide the teacher with guidelines concerning the proper handling and safe use of substances. The format and information provided by a MSDS/SDS may vary depending on the source but familiarity with the following information prior to conducting a lab or approving a research project is critical. The following are some of the many properties that can be found on a MSDS/SDS.

- flash point
- odor
- toxicity
- health
- fire
- reactivity hazards
- proper storage
- spill/leak cleanup
- disposal procedures
- protective equipment

A review of certain key sections on the MSDS/SDS will usually give a teacher a good understanding of the potential danger and risks involved with using the substance in the science classroom.

How to Read an SDS (Flinn Scientific):
https://www.flinnsci.ca/api/library/Download/74280f0955f94d6c8dd2d9023a16a39f

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.

Unknowns

Occasionally, the science teacher may come across a chemical substance in a container that has a deteriorated label, is unclearly labeled or is even missing a label. For example, in the course of its normal use, a label on a dropper bottle solution may have deteriorated.

In such a case, the following protocols are recommended:

- First and foremost, DO NOT use the chemical until it has been positively identified.
- If needed, communicate with other teachers in the department to find out if anyone has knowledge of that particular container. This may help to immediately resolve the issue.
- The teacher may attempt to deduce the chemical's identity, without the need of direct testing, based on any or all of the following:
    - The nature of recent experiments and demonstrations performed.
    - Review of inventory data.

- Physical characteristics of the unknown, including color, crystal texture, and density.
- Type of container (For example, stock bottle type.).
- If the label is fragmented, enough information may be sufficient to identify the chemical.
- Where the chemical was stored.

Once the substance is positively identified, it should be immediately and properly labeled. If the identity of the chemical substance is still not positively identified a few simple tests can be performed on micro-quantities of the unknown substance. For example, a simple pH test using pH testing paper can reveal enough additional information to identity the chemical.

Such tests can be found at: CAMEO Chemicals | NOAA

Further information can be located at: Waste Management | Florida Department of Environmental Protection

If the unknown chemical still defies identification, then contact the District to receive further instructions to determine final disposition of the unknown.

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: School Chemical Cleanout Campaign (SC3) | Florida Department of Environmental Protection

Information on the Florida Department of Education Laboratory Clean-out program may be found at: Safety in Science (fldoe.org)

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. < School Chemical Cleanout Campaign (SC3) | Florida Department of Environmental Protection

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

Mercury:

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

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

Specific Laws, Regulations and Guidelines

Microwave Ovens:

The use of a microwave oven in a science lab presents specific safety concerns including the possibility of fire and explosion. Overheating a closed container can result in an explosion. Heating items that contain metal can result in a fire. There have been accidents resulting from students deliberately heating objects containing metal or flammable liquids.

- Student access to a microwave oven located in a lab or classroom should be limited.
- If a microwave oven is used it is recommended that the teacher operate the microwave or directly supervise student operation of the microwave oven.

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.

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

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.

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.

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.

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

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

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.

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.

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.

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.

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.

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.

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

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 before any animal is placed in the student area. For this reason, 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. By observing animals, students can learn a great deal about animal behavior, nourishment, life patterns, and environmental considerations.

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 into 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 requirements:

- Parent permission is obtained for all students who may come in contact with or be in the same location as the animal(s).
- Animal(s) must be tied directly to the curriculum.
- Principal permission is obtained. The principal has the right to deny animal placement in any classroom.
- Animals are healthy, and those animals that may carry pathogens have been declared pathogen-free by a veterinary examination.

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 students. 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 temperatures. The teacher must supervise all student involvement. Due to the concern for allergies, parental 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 wash their hands after handling them.
- 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 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.

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.
- 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.

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.

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**.**

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.

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.

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.