# SAFETY

## *in the Science Classroom*

EDU Consulting LLC

Science • Technology • Engineering • Mathematics

# ORGANIZATION IS KEY

**'Do' the experiment before assigning it to the students.**

- Teacher should have all materials ready to distribute to the students.
- Teacher should supervise all of the student's activities.
- Teacher should have a plan for collecting materials after the activity.
- Teacher should be able to instruct the students in what is expected of them

# SCHOOL SAFETY AND VIOLENCE PREVENTION ACT (AB 537)

- Ed. Code Sections 32228 – 32228.5
- **Funding** = a minimum allocation of $5,000 for each school site, or a minimum allocation of $10,000 for each school district, whichever is greater.
- **Allocated on an entitlement basis** based on previous year CBEDS enrollment count
  - *Applies to Grades 8-12*

# KNOWLEDGE IS POWER

- Teachers are **entrusted** with the responsibility to educate our children.

- In carrying out this fundamental responsibility, the teacher has a number of duties…

# TEACHER LIABILITY

- Accidents **directly tied** to teacher activity
- Accidents involving the **condition of premises**
- Accidents involving **violations of statutes and other safety rules**

# BEHAVIOR-BASED SAFETY

- **Hazards** represent only **2%** of safety issues

- **Training and performance** represents **98%** of safety issues

# DUTY OF CARE

- **Supervising** students in the classroom
- Providing **adequate instructions**
- **Maintaining lab equipment** in proper working order
- Providing **safe facilities and equipment** for labs
- **Warning students** of any dangers

# NEGLIGENCE

***Negligence is the breach of a duty owed to someone to protect him or her from unreasonable risks of harm.***

# REASONABLENESS

- While science presents potential hazards, **prudent safety practices** greatly reduce accidents.

- Safe science classes have ***no greater risk*** than P.E., vocational ed., or home economics classes.

# STANDARD OPERATING PROCEDURES (S.O.P.)

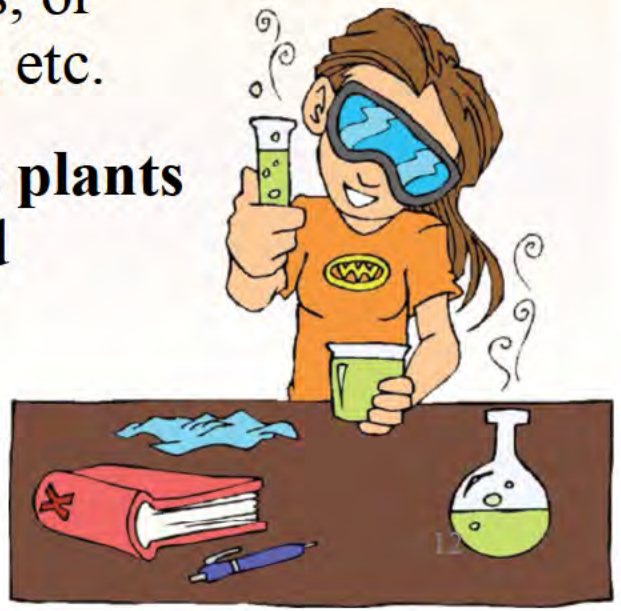
- **Science teachers must be familiar with their district Standard Operating Procedures as they pertain to:**
  - Chemical storage rooms
  - Materials Safety Data Sheets (MSDS)
  - Emergency equipment
  - Good housekeeping
  - Emergency evacuation
  - Lab safety

# KEY SAFETY ISSUES

- Proper **eye-care** safety practices
- Proper handling of **glassware**
- Proper setup and handling of **electrical equipment**
- Regular **inspection & testing** of equipment
- Safe use of **chemicals** in the laboratory
- Correct methods for **storing, handling, and disposing** of surplus, waste and deteriorated chemical substances

# GENERAL SAFETY

- **Goggles** must be worn by students AND teacher when doing laboratory work
- **Goggles** shared by students should be sanitized between uses
- Precautions must be taken when using **sharp objects** (i.e., knives, scalpels, needles, pins, etc.)
- Students should not clean up **broken glass**; Teacher should use leather gloves when picking up broken glass, or use tools such as brooms, dustpans, forceps, etc.
- When working with **hot materials, noxious plants or live animals**, teacher and students should wear proper hand protection
- **Wash hands** after lab work



# ADVICE FOR TEACHERS

## SUPERVISION OF LABORATORY ASSISTANTS

- ✓ Lab assistants are to be held accountable to the **same safety standards** as every other student in the classroom.

# EYE INJURIES

- **Immediate treatment** = 15 minute flush with water
- **Middle & High Schools** should have an approved eyewash station
- **PREVENTION** = always wear approved eye protection
- Teachers should follow the same approach to safety when *demonstrating an experiment*

# EYE WASH STATIONS

- A plumbed-in eyewash station, supported by a face-and-shower "drench hose" **must be available in each lab** in which chemical splashes on eyes, skin, or clothing are possible.

- No more than **10 seconds** must be required for the injured person to reach the eyewash station when needed!

# SAFETY ISSUES

- Appropriate, safe use of **heat sources** in the laboratory
- **First-aid** procedures
- **Prompt notification** to supervisor of a potentially dangerous condition and/or calling "911" if the situation is an emergency
- **Proper fire prevention & control** techniques

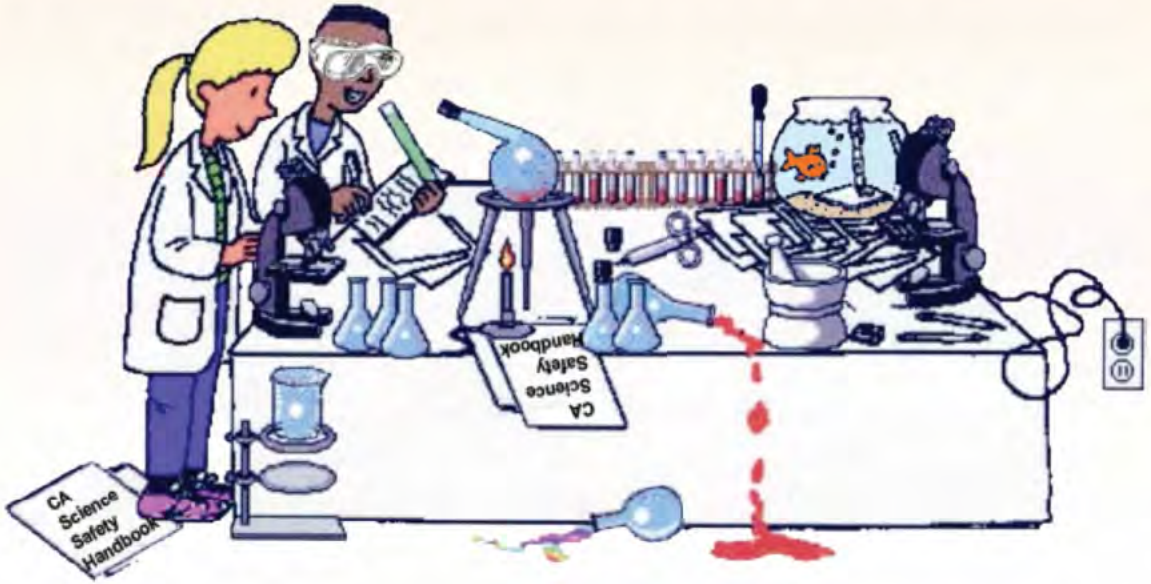
# SAFETY WITH FIRE & HEAT

- Teacher should **never leave the room when any fire is lit** or any heat source is being used
- Never heat **flammable liquids**.
- Use **only tempered glassware** for lab work

- **Tie back long hair** when working around any heat source
- When using a **hot plate**, locate it so that student cannot pull it off the worktop or trip over the cord
- Never use **alcohol burners**
- **Candles** should be placed in a **drip-pan** before using and should only be used under adult supervision
- A **fire extinguisher** should be kept near the activity area and the teacher should be *trained in its use*

# SAFETY ISSUES

- **Prohibition of the use** or presence of any venomous animals, constrictors, poisonous plants, or plant pests
- **Safe and humane treatment** of animals
- Correct methods for **cleanup after experiments**



# SAFETY ISSUES

- Proper behavior and **courtesy in a laboratory situation**

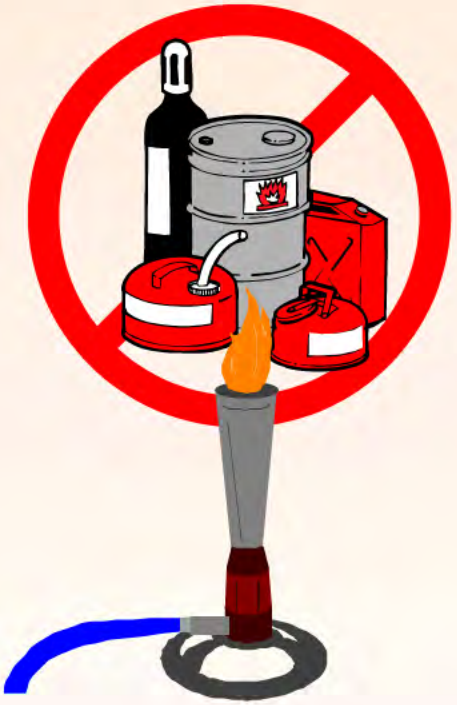
- **Earthquake-safe behavior** and evacuation routes

# DANGEROUS MATERIALS

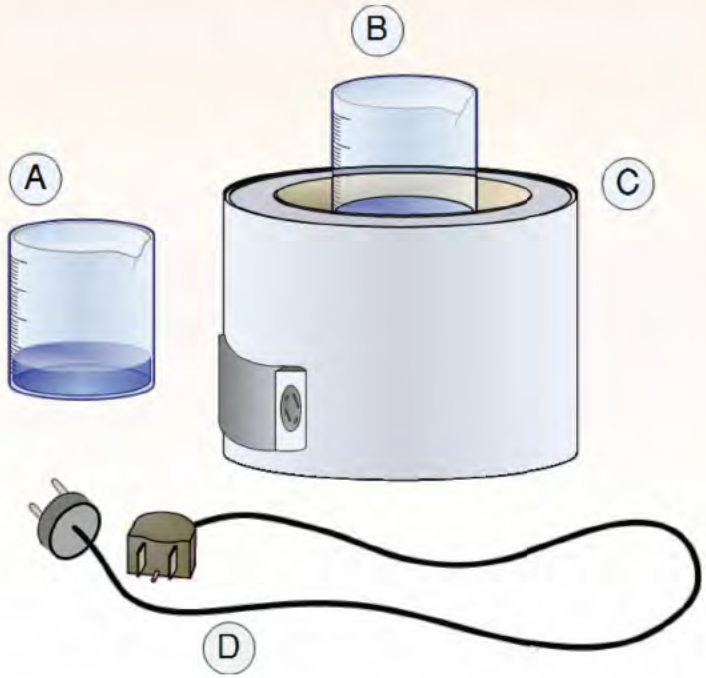

- Use only **safety matches**
- Use only **non-mercury thermometers**
- **Discard old batteries** appropriately
- Never allow or encourage students to place any materials **near their mouth, nose or eyes**
- Do not touch **dry ice**
- **Clean up all liquid spills** and inform the teacher immediately. They can be slippery!
- Do not use or mix chemicals in any manner other than that stated in the **approved laboratory procedure**

# FLAMMABLE SOLVENTS

- **Never** use the flame to heat solvents



- Use **electric heat** via a water bath



# SAFETY TESTS

- Safety in the laboratory should be **taught and reinforced** throughout the year
- Safety is a **team effort**
- Teacher should **keep a log** to document safety instruction (topic, date)
- Student **Safety Agreement**
- Laboratory **Safety Test**

# EMERGENCY PROCEDURES

- Teacher should **establish emergency procedures** for (at least) the following…
  - *emergency first aid, electric shock, poisoning, burns, fire, evacuations, spills and animal bites*

- **Review** emergency procedures with students before beginning any classroom experiment
- **Be prepared** and have equipment and supplies nearby for unforeseen emergencies
- **Identify emergency authorities** and their contact information; Establish procedures for notifying appropriate authorities in the event of an emergency

# FIRST AIDE

- **ELECTRICAL SHOCK**
  - Use dry insulator to push victim away from electrical source

- **BURNS**
  - Do not attempt to neutralize chemical burns; flush with low pressure water

# FIRST AIDE

- **CARDIOPULMONARY RESUSCITATION (CPR)**
  - Must be done by someone who is trained by the American Red Cross or American Heart Assn.

- **BITES BY SNAKES, INSECTS & MAMMALS**
  - It is a violation of Ed. Code to have *poisonous animals* in the classroom

# EXPOSURE TO POISONS

- **Contact local Poison Control Center**
  - See *Safety Handbook for California Public Schools,* Appendix E for Regional Poison Centers

- **National Poison Control Center**

# ACTION RESPONSE

- Remain **calm**
- Have someone **call for assistance**


- **Stay with the person** until the supervisor or medical personnel takes over
- Written **accident report** should be filed
- Do an **"After Action Report"**

# IN-DEPTH TRAINING AVAILABLE

For **in-depth training** on safety and liability issues, such as:

- *General safety and liability*
- *Facilities and equipment*
- *Chemical safety*
- *Life Science laboratory safety*
- *Elementary science safety*
- *Field Trip safety*

**CONTACT:**