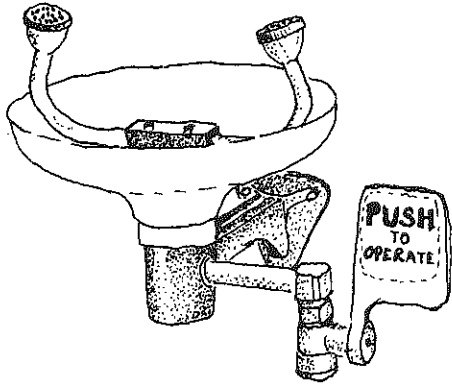


# A Safety Checklist for School Science Labs

WOHRC offers some tips for preventing serious accidents.

Recently, a building at Rutgers University was closed because its science laboratories are suspected of being linked with an undue number of cancers and other illnesses among the building's occupants.

The incident pointed up a dangerous situation that can and may exist at many school laboratories. Recently WOHRC investigated those in high schools and found a significant number of toxic chemicals, often handled without adequate safety provisions. A list of such chemicals found in a similar survey by the federal Consumer Product Safety Commission appears here.



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Besides noting that some are carcinogens, some teratogens and some both, the CPSC reported some 3,000 school lab injuries during the 1978-79 school year. Most involved chemical burns from acids and alkalies; others, chemical dermatitis reactions and cuts from broken glassware.

The WOHRC investigation also found:

- 73 percent of teachers reported that laboratories have inadequately ventilated hood space in which students can work;
- about 50 percent need more supervision of students during lab activities;
- 63 percent do not keep an accident log;
- 56 percent do not have adequate audio visual materials describing safety and/or health hazards of chemicals.

In the interests of better safety for both teachers and students, WOHRC presents the following checklist:

## The working environment

1. Does each laboratory have at least 100 foot-candles of diffused light?
2. Do laboratories give each student a minimum workspace of 35 square feet?
3. Does each laboratory have two unobstructed exits, not near each other and opening onto a main passage or the outside of the building?
4. Are lab table tops constructed of noncombustible material?
5. Are there master shut-offs for gas, water, electricity and other services?

## Laboratory equipment

Do you have available:

1. properly sized fume hoods and/or exhaust fans to remove noxious or toxic fumes?
2. fire extinguishers that are regularly inspected and appropriate to the type of fire that may be anticipated?
3. safety showers in areas where hazardous chemicals are used?
4. a face and eye shower?
5. adequate storage and supply space?
6. a first aid kit plus a copy of the Red Cross manual *Standard First Aid and Personal Safety*?
7. metal or earthenware waste jars?
8. sand, fire blanket, vermiculite, bicarbonate of soda and the like in case of fire or spills?

## Teaching procedures

1. Are all teachers qualified to teach science assigned to science classrooms?
2. Do all teachers have Red Cross certification in First Aid?
3. Before class, does each teacher rehearse actual procedures of experiments and demonstrations to make sure that all apparatus works properly and that safety precautions are adequate?
4. Are sets of safety rules posted in several places around the room and discussed with students?
5. Are demonstrations involving explosive mix-

tures so arranged as to shield both pupils and teachers from the results of the explosion?

6. Even when there is no likelihood of an explosion, are pupils asked to evacuate seats directly in front of the demonstration table to avoid splattering or inhalation of fumes?

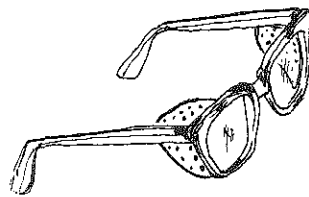
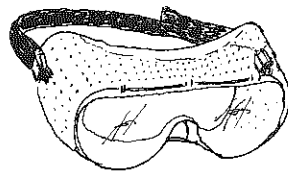
7. When flammable volatile liquids such as alcohol are used in a demonstration are all ignition sources removed from the classroom?

## Student procedures

1. Do students report all accidents to the teacher, no matter how minor?
2. Are students prohibited from studying, working or experimenting without competent supervision?
3. Do students (and teachers) take care never to eat, drink or smoke in the laboratory?
4. Are students warned not to taste or touch chemicals with their hands?
5. Are gloves worn when handling some reagents, and hands kept away from the face?
6. Are hands washed thoroughly with soap after each laboratory period?
7. Do students avoid wearing long, hanging necklaces and bulky jewelry?
8. Do they roll long sleeves above their wrists and remove ties, coats and sweaters?
9. Do they tie back long hair?
10. Do students take care always to remain at their stations during an experiment?

## Housekeeping

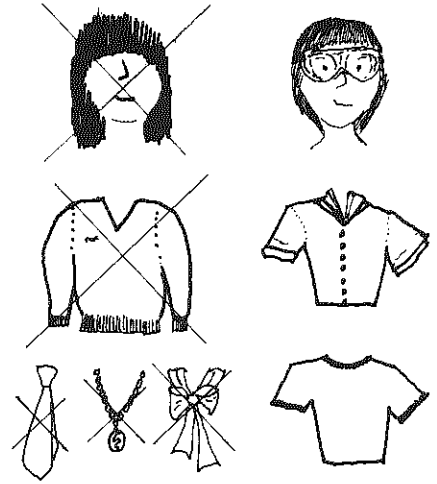
1. Do teachers regroup or remove accumulated materials that may become hazards?
2. Are floors kept clean and uncluttered?
3. Do students always clean, and wipe dry, all desks, tables and work areas at the end of each lab activity?
4. In disposing of waste, do teachers take care of dangerous materials in accordance with community laws and standards?



5. Do solid wastes have separate receptacles for those that are flammable?
6. Is there a separate receptacle for broken glassware?
7. Are matches thrown into metal containers with sand in them?
8. Are corrosive or caustic liquids poured down the drain and flushed with plenty of water?
9. Do teachers and students avoid pouring flammable liquids down the drain because their vapors can accumulate in plumbing and cause an explosion? Are they, instead, collected in a safety can and, if possible, poured by a teacher

into the ground away from the school?

10. What happens to over-age or surplus chemicals which, because of toxicity, pollution potential or explosion danger, cannot be disposed of easily? Are they reported to the department chairperson and/or the appropriate agency?



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## Storage

1. Are combustible and dangerous materials kept securely locked in a safety cabinet?
2. Are acids stored in approved cabinets or closets, off the floor and below the height of the person who has access to them?
3. Are students forbidden access?

## Labelling

Are all chemicals labelled with the following information:

1. name and formula?
2. degree of hazard denoted by the word DANGER or WARNING or CAUTION?
3. description of the particular hazard, such as POISON, CAUSES BURNS, FLAMMABLE, VAPOR HARMFUL?
4. precautionary measures, such as: *Keep away from heat, sparks or open flame; Use only with adequate ventilation?*
5. instructions in case of exposure, such as: *In case of contact, flush with large amount of water?*

## Eye and face protection

1. When experiments are particularly dangerous and there is not adequate protection available, are they eliminated from the curriculum in favor of controlled demonstrations and films?
2. Do students wear safety glasses with clear side shields for most laboratory work?
3. When there is danger do they wear approved chemical goggles?
4. Do they wear full face shields when working with glassware in high temperature or under reduced or elevated pressure?
5. Is the wearing of contact lenses in the laboratory strongly discouraged, unless they are worn with goggles or a face shield? Are students warned that chemicals can infuse under the lenses and cause irreparable eye damage?

*The material above was adapted from Safety in the Secondary Science Classroom published by the National Science Teachers Association.*

## Some chemicals are double hazards on CPSC list

### Suspected carcinogens

Acetamide  
Isoamyl alcohol  
Aniline hydrochloride  
Benzene  
Benzidine reagent  
Benzoic acid  
Cadmium chloride  
Carbon tetrachloride  
Chloroform  
Chromic acetate  
Chromium trioxide  
Colchicine  
Dichloromethane  
Dichlorophenol  
Diphenylamine

Ethylene dichloride  
Ferric oxide  
Formaldehyde  
Isobutyl alcohol  
Kerosine  
Lead acetate  
Methylene chloride  
Nickelous ammonium sulfate  
Nickelous chloride  
Nickelous nitrate  
Phenol  
Propanal  
Pyrogalllic acid  
Sodium chromate  
Sodium dichromate

Tannic acid  
Thioacetamide  
Trichlorotrifluoroethane

### Suspected teratogens

Cadmium chloride  
Carbon tetrachloride  
Colchicine  
Diphenylamine  
Ethylene dichloride  
Lead acetate  
Lead chloride  
Lead nitrate  
Lithium chloride  
Methyl ethyl ketone  
Salicylamide