HHW Program's Role in School Chemical Cleanouts

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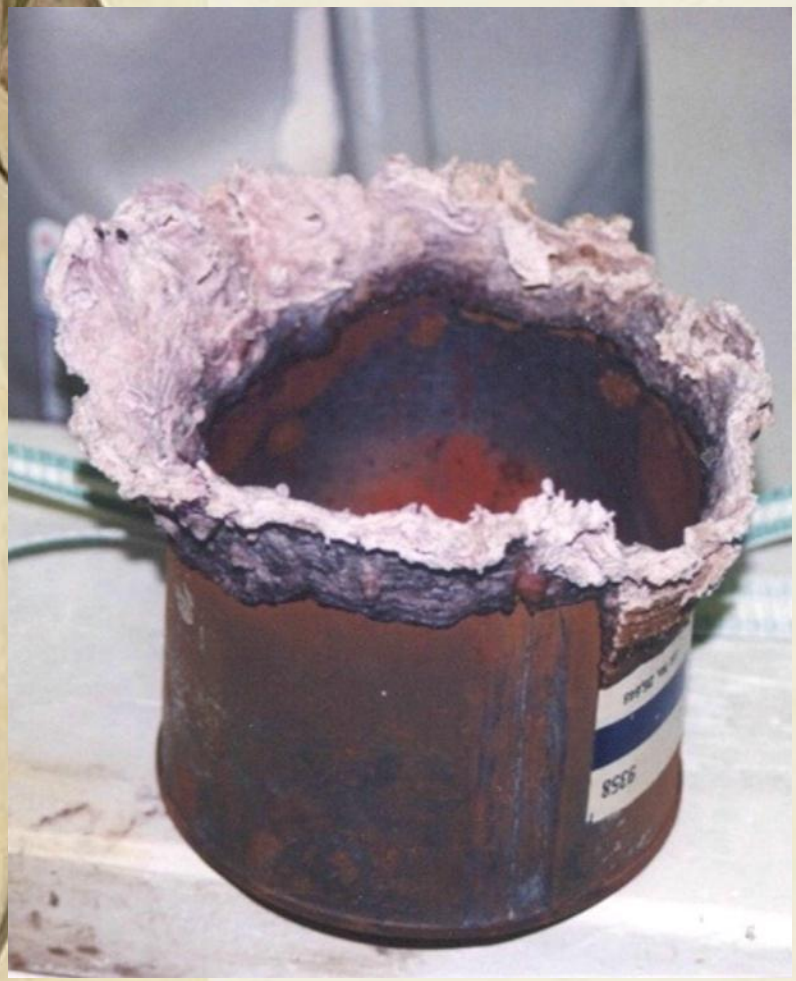
1996
Washington School Sweeps

- Try to answer this question
- Why are CESQGs clueless about hazardous waste regulations?
- We visited community and vocational-technical colleges
- While there I visited their science labs

1997

Trained Chemistry Instructors

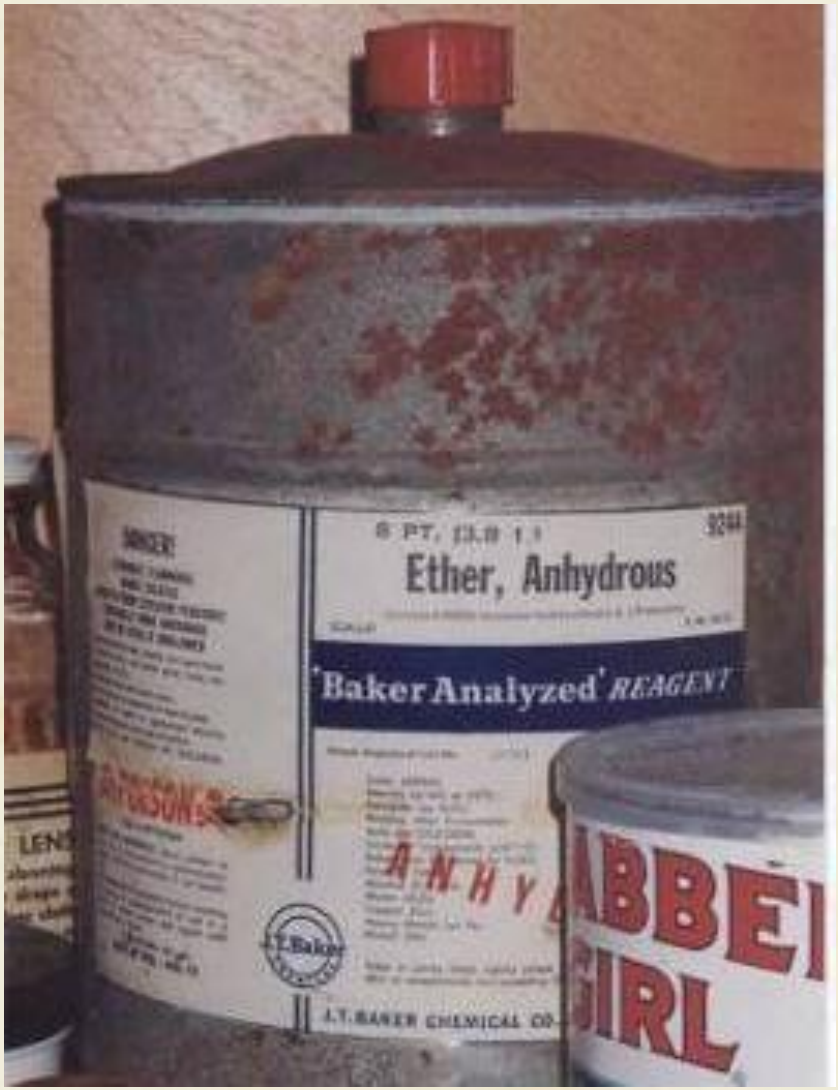


2 High School Teachers Snuck In

- "That looks like our high school lab"
- Well, maybe I should visit your lab!
- Here's the $535,000 photograph I took

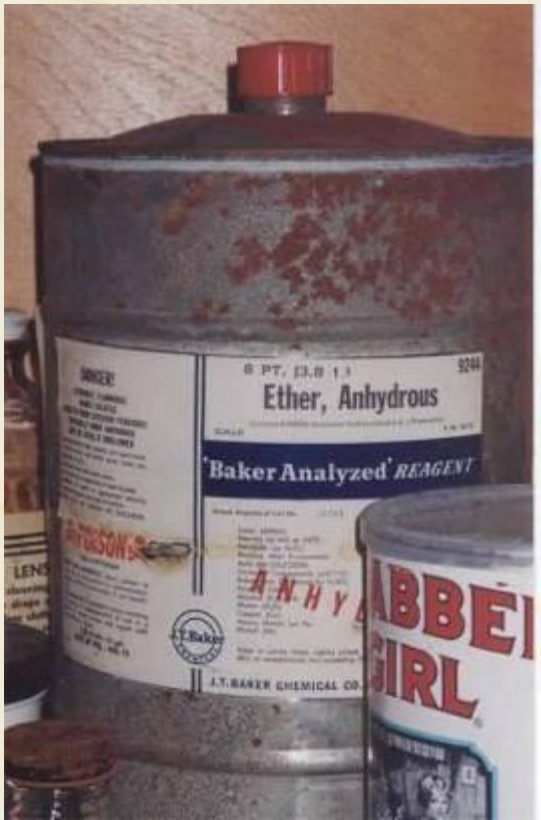
Meet My Daughter Autumn

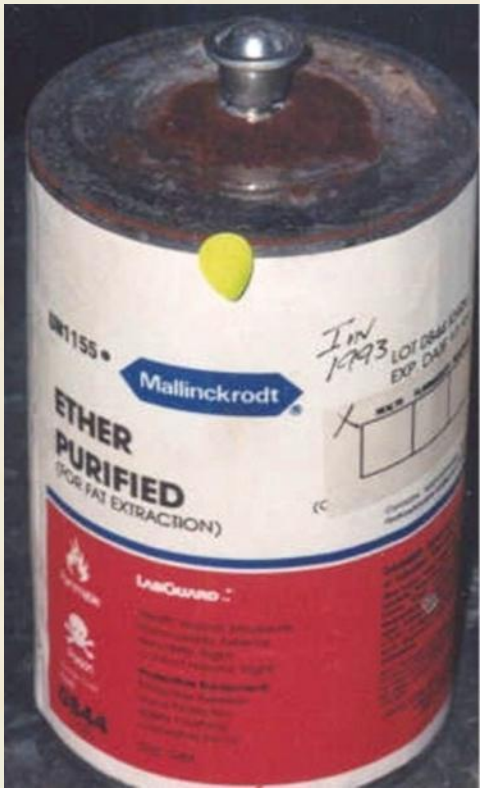
60 Feet Away From Her in 2000



Ethyl Ether Hazards

- Highly flammable
- Explosive peroxides form when it reacts with air





Safely Removed in 2000

Seattle, February 28, 2001
6.8 Nisqually Earthquake

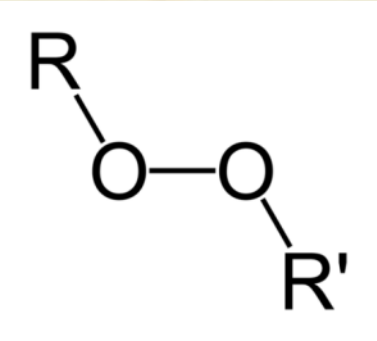
I routinely find highly hazardous chemicals in secondary schools

High Risk Chemicals in Schools

- Peroxide Forming Chemicals & Explosives
  - Potassium, Ether, Dioxane, Tetrahydrofuran, Picric Acid, Sodium Azide, Perchloric Acid, Di- and Tri-nitro Organics
- Water and Air Reactives
  - Potassium, Sodium, Lithium, Calcium Carbide, White Phosphorus, Lithium Aluminum Hydride, Sodium Dithionite
- Corrosives
  - Hydrofluoric Acid, Perchloric Acid, Bromine, Nitric Acid
- Carcinogens and Severe Toxins
  - Arsenic, Cadmium, Chloroform, Formaldehyde, Potassium Dichromate, Mercury & Cyanide compounds, Phenol

Peroxidizable Solvents I've Seen

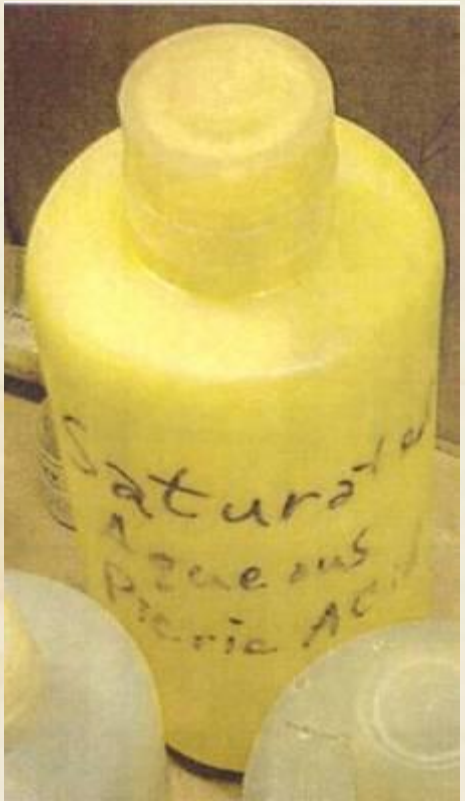
- Peroxides without concentration
  - Isopropyl Ether
  - Potassium Amide
  - **Potassium Metal**
  - Sodium Amide



- Peroxides if concentrated by evaporation & distillation
  - **Acetaldehyde**
  - Benzyl Alcohol
  - Cumene
  - Cyclohexanol
  - **Cyclohexene**
  - **Diethyl Ether**
  - Dioxane
  - Methyl Isobutyl Ketone
  - **Tetrahydrofuran**
  - Vinyl Ether

Picric Acid – Trinitrophenol
(Constituent of Bouin's Fluid)

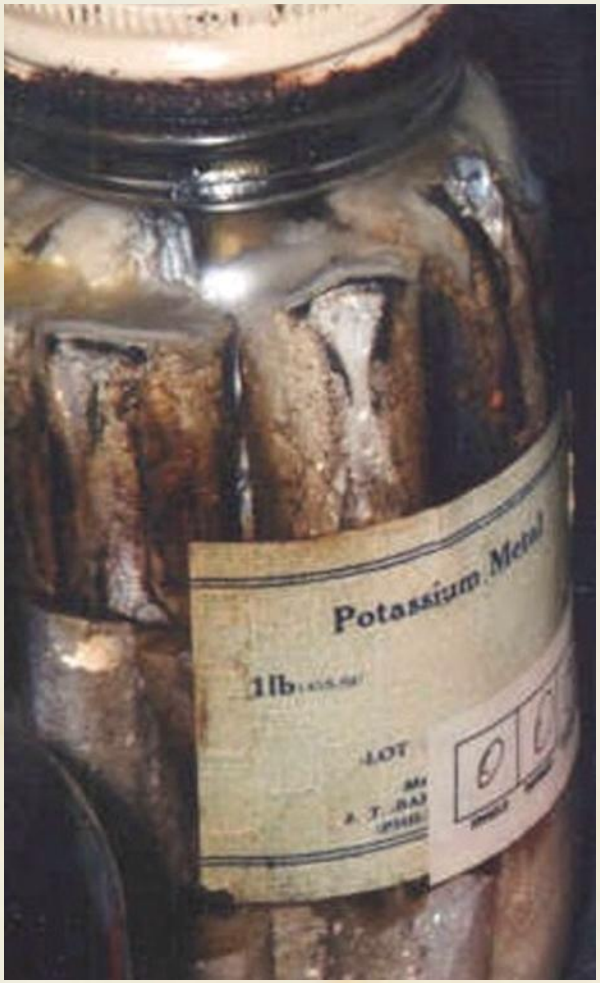
- Shock-sensitive high explosive when dry or especially in contact with metals (like the cap below)
- Found in medical labs (stains brain cells) and schools




Hand-written
word “Nitro”
In middle school
GLYCERINE
ORG-
0-2
FOR MANUFACTURING USE ONLY
9-80
SCIENTIFIC SUPPLIES COMPANY
Laboratory Apparatus and Reagents
SEATTLE, WASHINGTON
Goldfish

Potassium Metal

Peroxide Former & Water Reactive

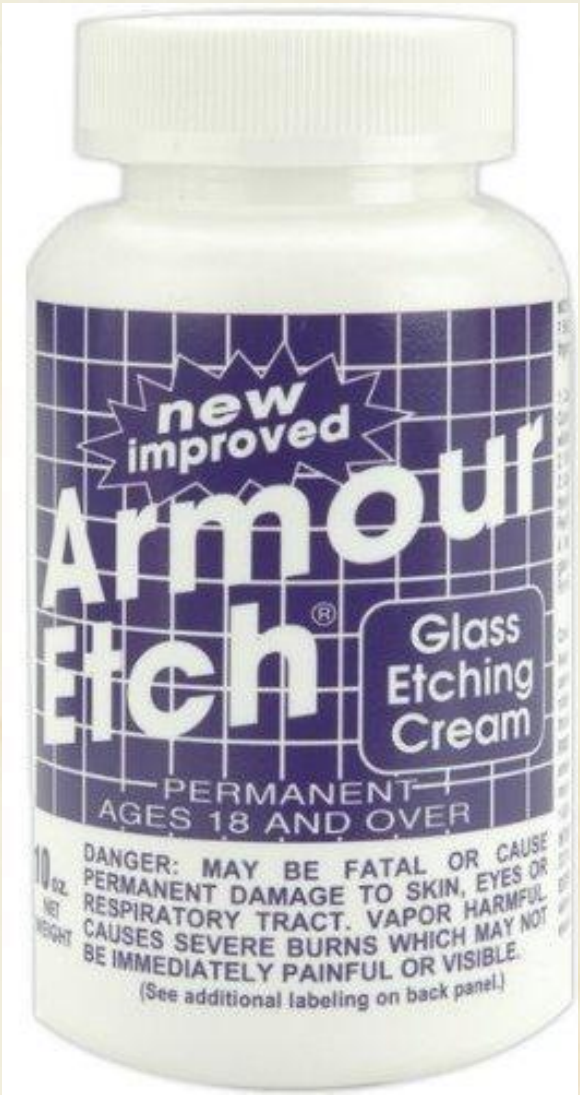


Funky looking acid bottles
This is NOT normal

Hydrofluoric Acid

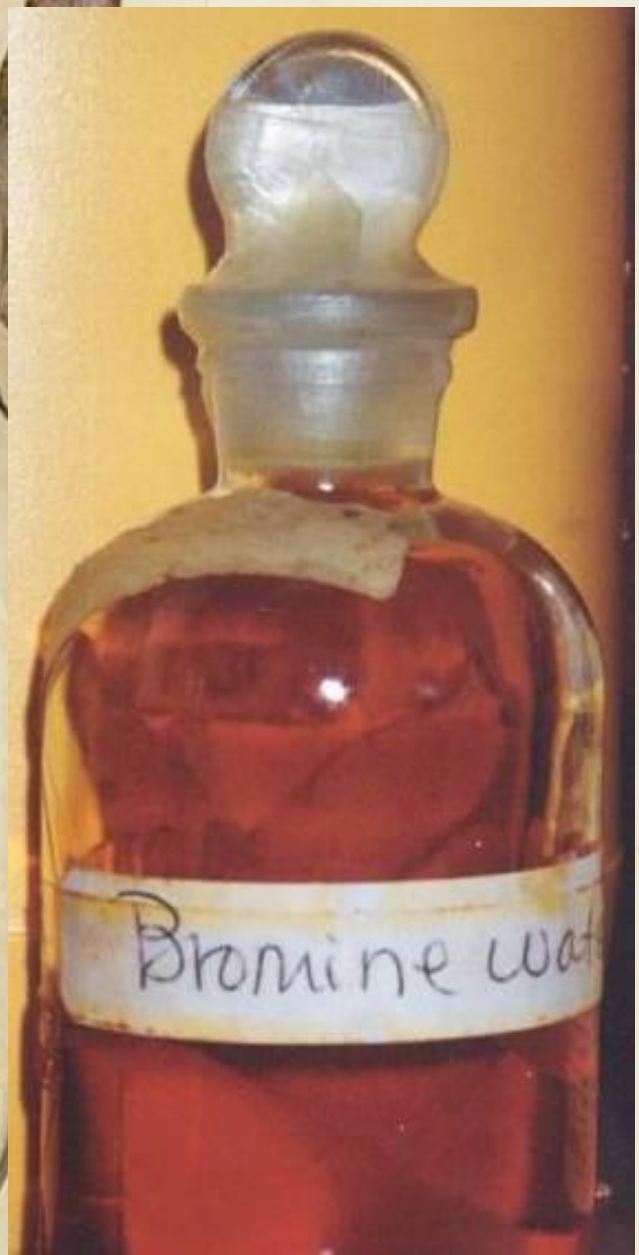
- Anesthetic
- Bone disintegration
- Dissolves glass
- Extreme pain,
- Gangrene, amputation

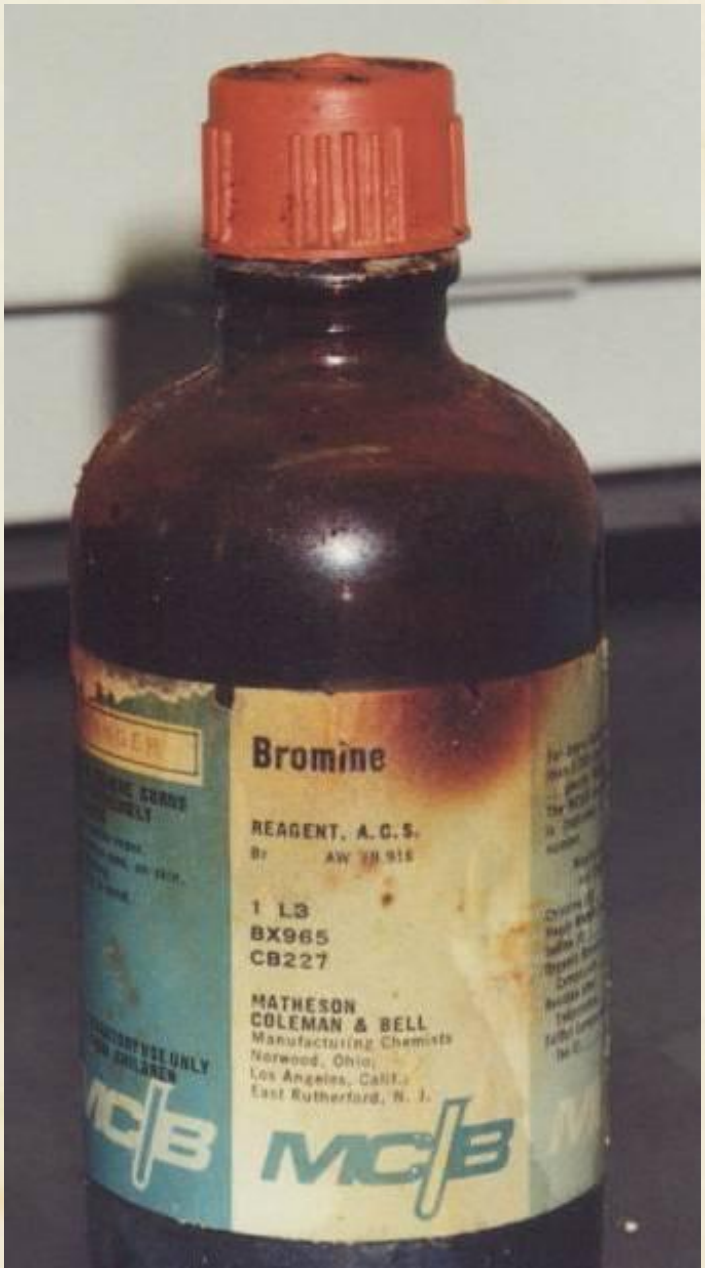
Ammonium Bifluoride Etch

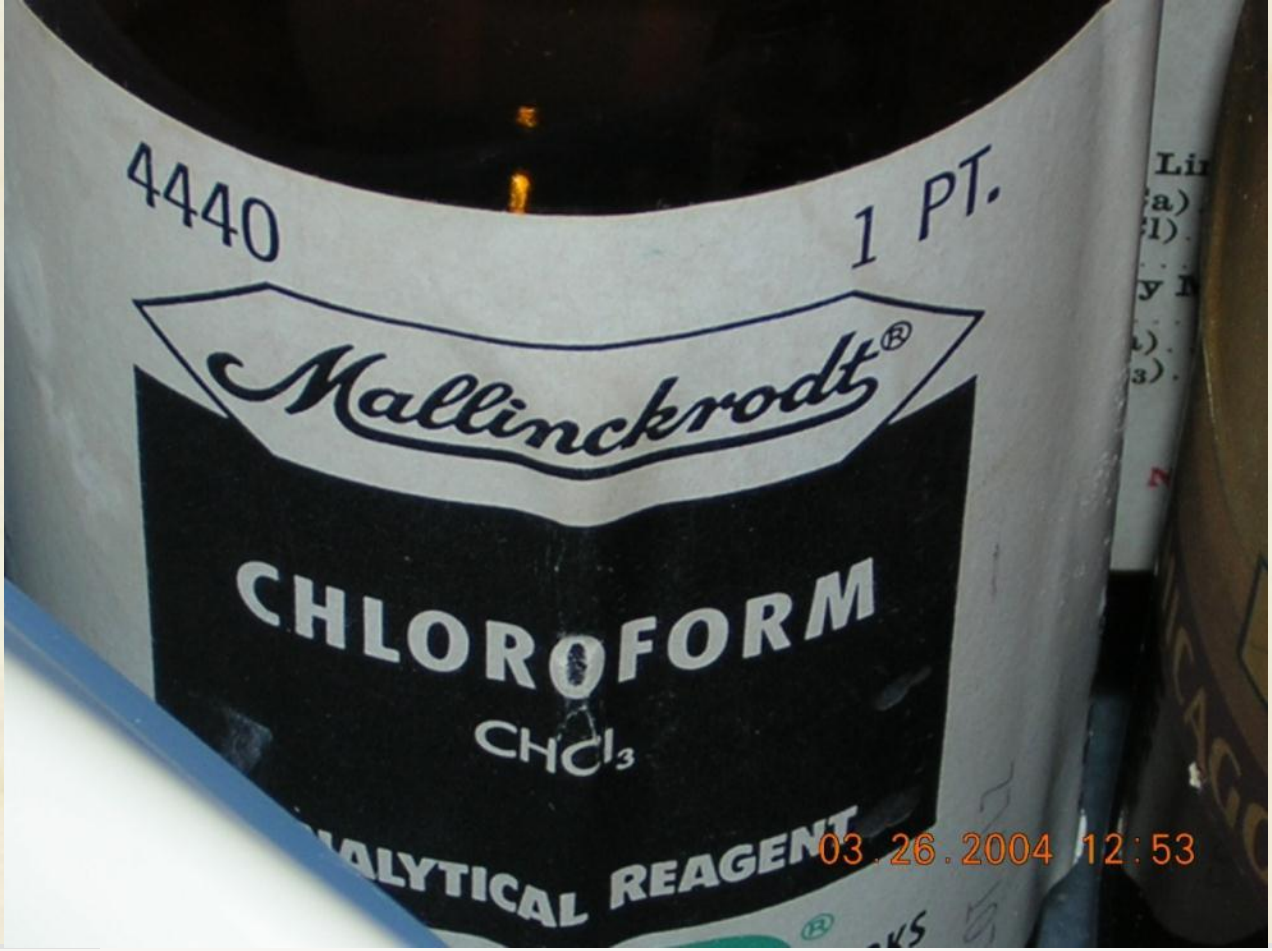


Nitric Acid (HNO_3)
Oxidizer, Corrosive & Cap Eater

Bromine – Toxic Inhalation Hazard

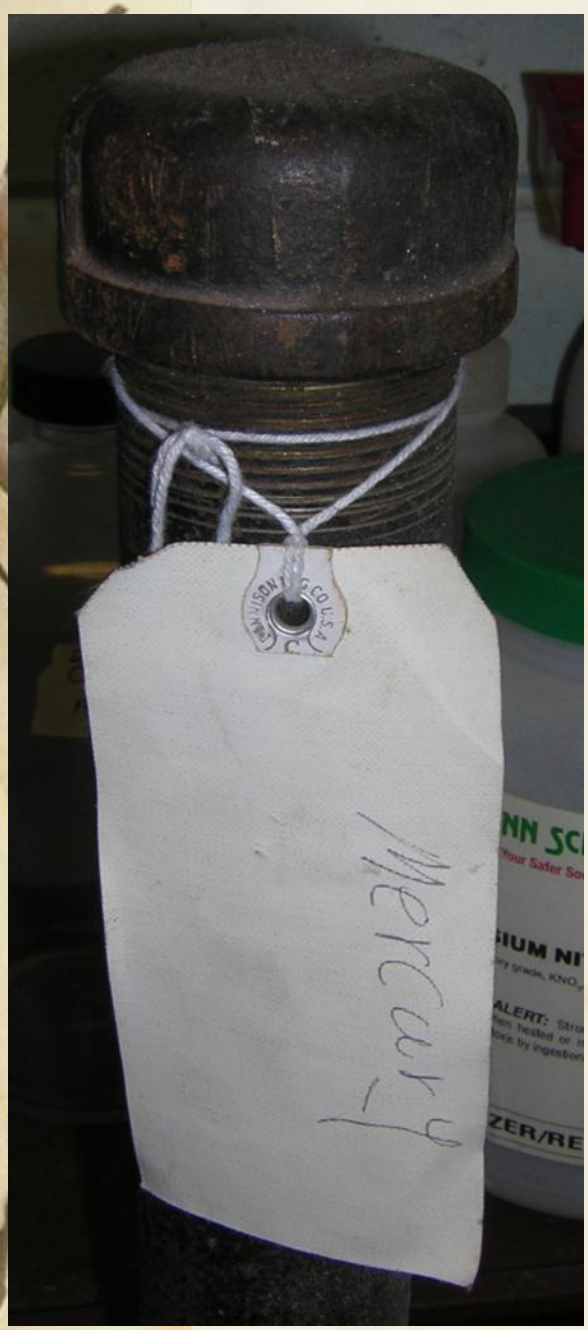






Chloroform	Slightly toxic by ingestion & inhalation. Reacts with light to form poison phosgene gas.	Carcinogen

Assorted Toxics


Mercury

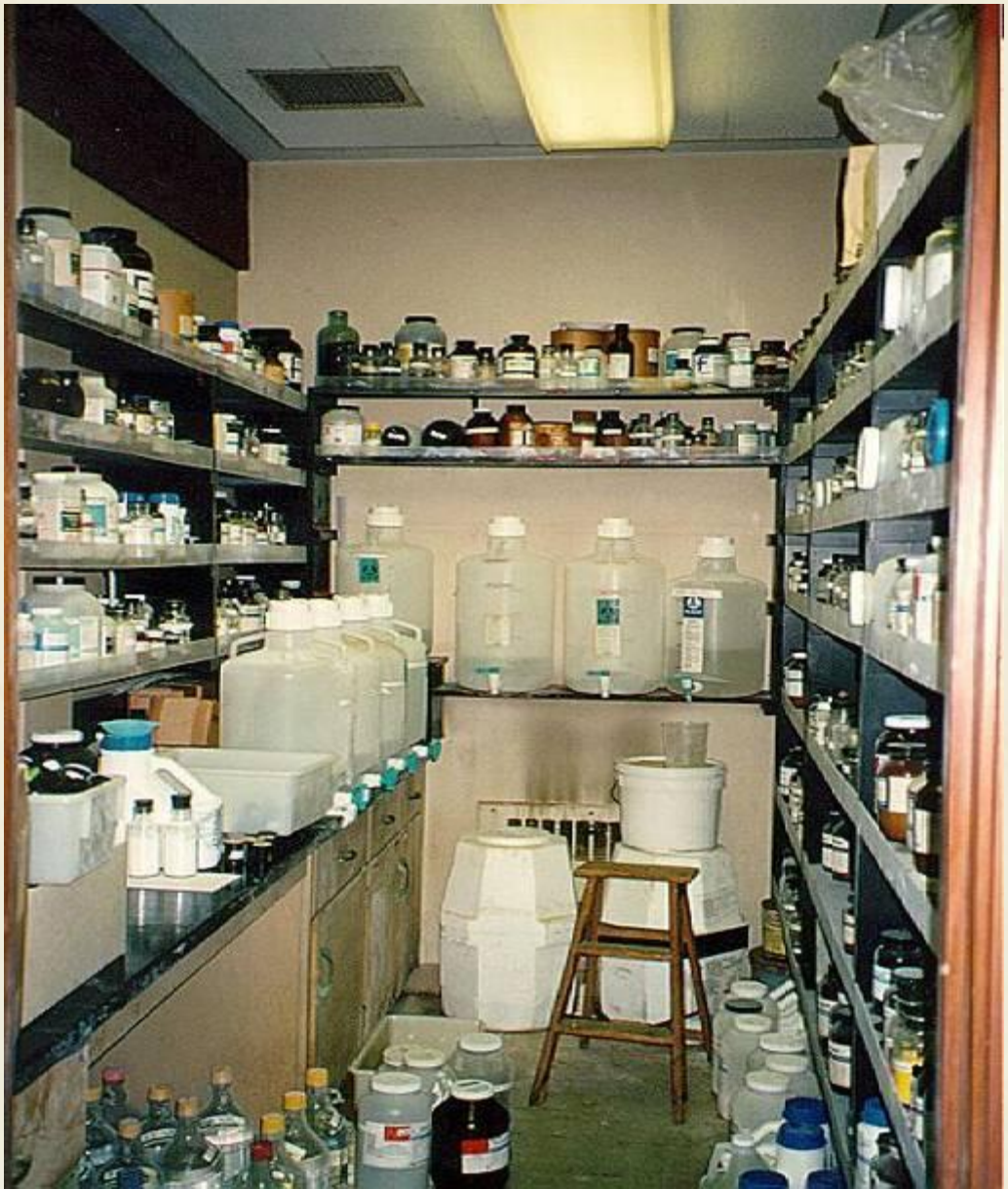

DUNKIN'
DONUTS


DUNKIN'
DONUTS

Arsenic & Cyanide

To Decide What Needs to Go You Have to Find It

Look In the Stockroom



In the Cabinets

On Shelves

On Tables

In and Under the Hood

In Drawers

In Boxes

In the Refrigerator in the Lab

By the Sink

Under the Sink

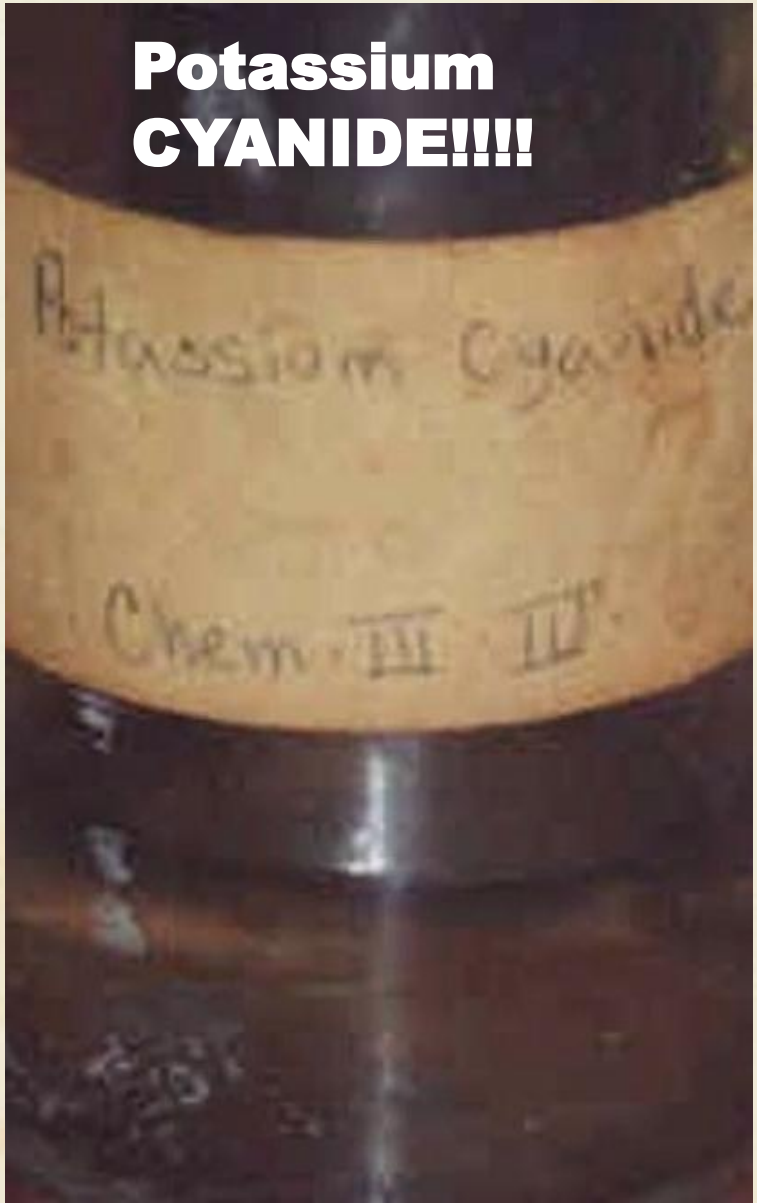
Under the Other Sink

On the Benches

On the Carts

In Corners

In Bookcases by students

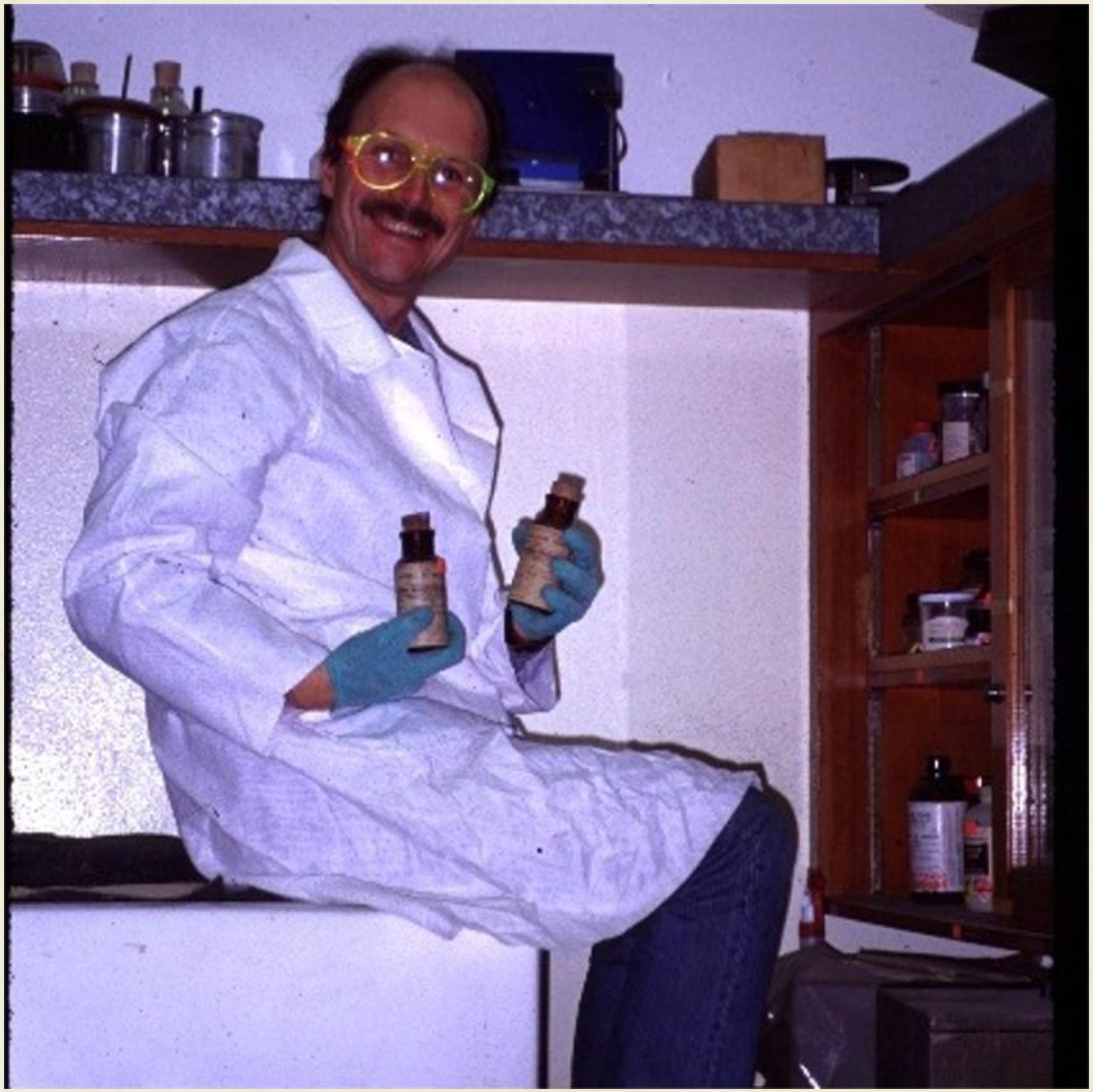


Look High

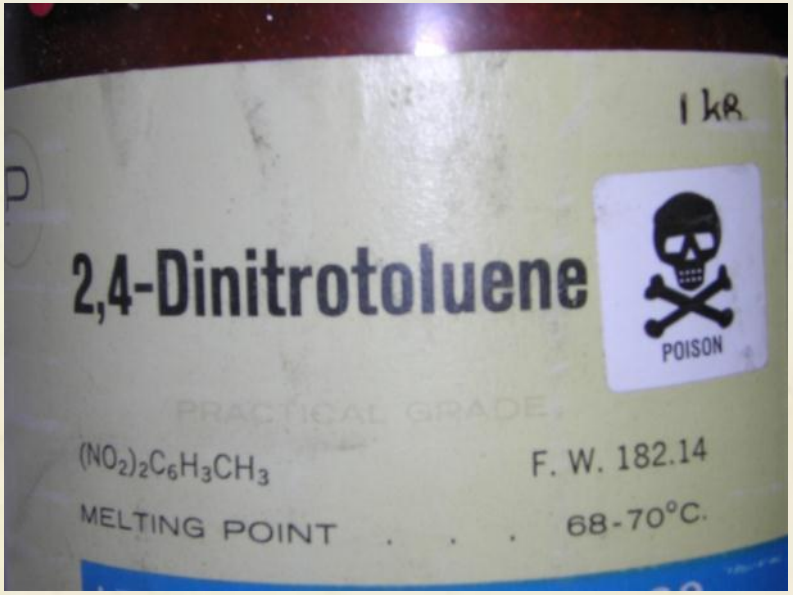
Look Low

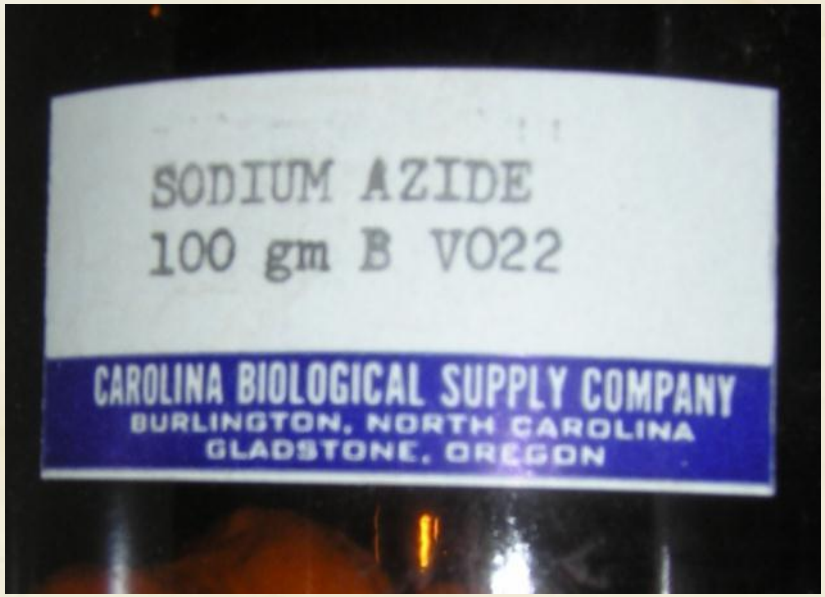
Check the Backyard

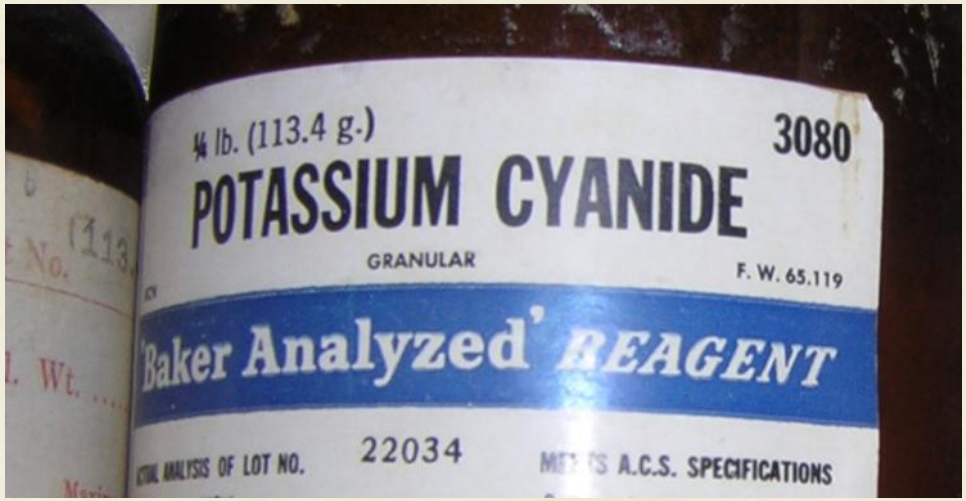
Maybe It's Just in King County!



Nebraska


1 kg
2,4-Dinitrotoluene
POISON
$(NO_2)_2C_6H_3CH_3$
F. W. 182.14
MELTING POINT . . . 68-70°C.


SODIUM AZIDE
100 gm B V022
CAROLINA BIOLOGICAL SUPPLY COMPANY
BURLINGTON, NORTH CAROLINA
GLADSTONE, OREGON


¼ lb. (113.4 g.)
3080
POTASSIUM CYANIDE
GRANULAR
F. W. 65.119
'Baker Analyzed' REAGENT
22034
A.C.S. SPECIFICATIONS

Tennessee


0825
ETHER
ETHYL ETHER TECHNICAL
NOT FOR MEDICINAL USE
MOTOR PRIMING GRADE
DANGER
EXTREMELY FLAMMABLE
LIQUID
HARMFUL IF SWALLOWED
OR INHALED
HANDLING AND STORAGE
USE ONLY IN WELL VENTILATED
KEEP AWAY FROM HEAT, SPARKS
FLAME
KEEP OUT OF THE
REACH OF CHILDREN
HUMCO
LABORATORY


Cabisco
CHEMICAL
DIVISION
ACETONE

Missouri

Virginia

Iowa

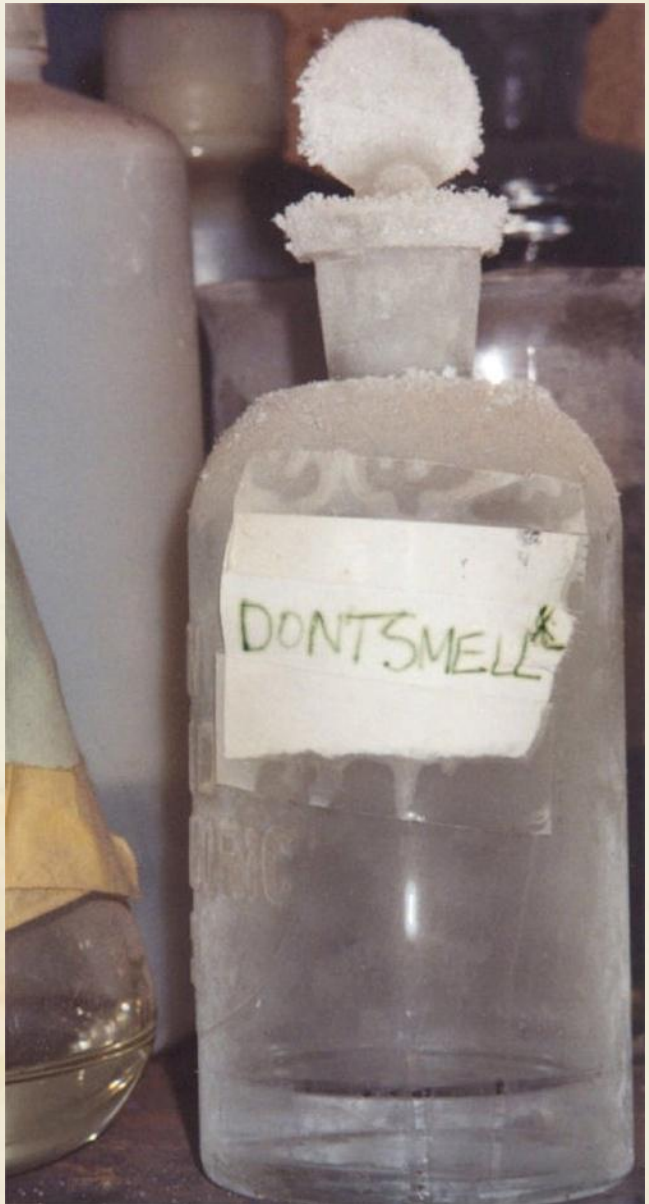
Florida

Oregon

Colorado

Clean Sweep NY
Pesticide & Lab Chemical Collections

Washington

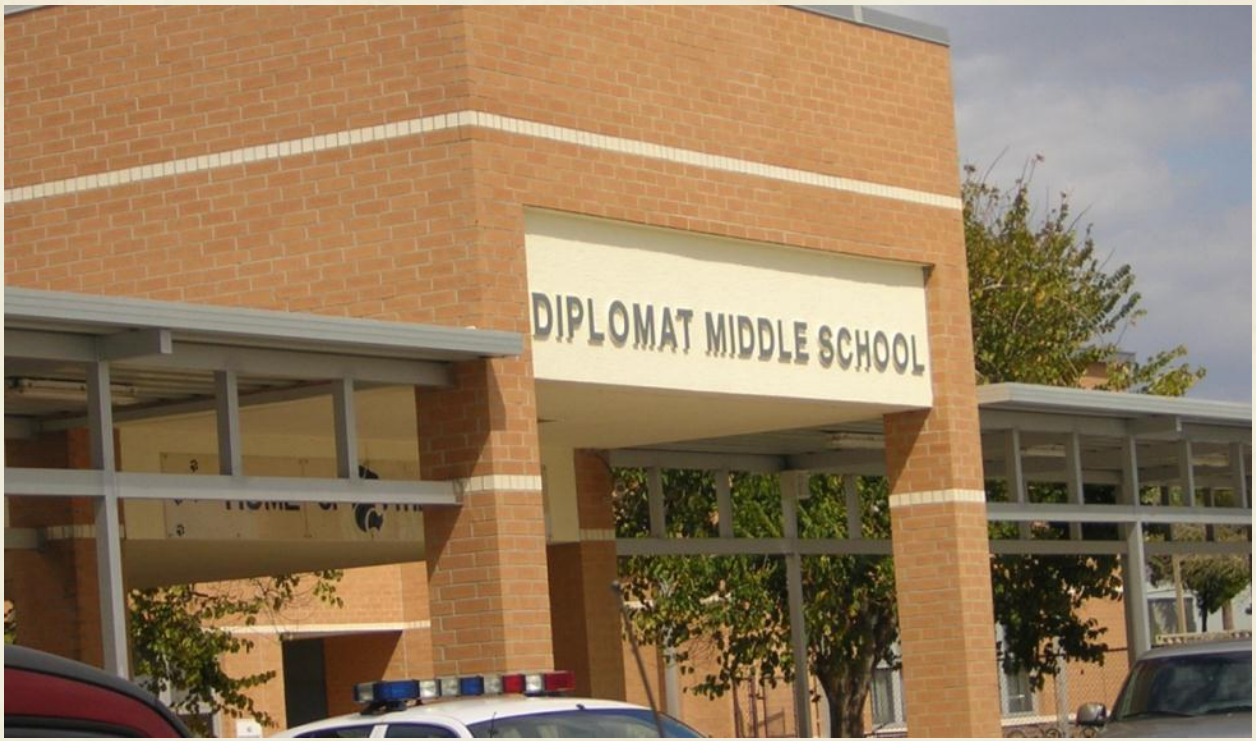


It's the Russian's Fault!

- October 1957 Sputnik launched
- The U.S. panics
- By 1960: $4,000,000,000 in grants to schools for science
- Schools buy hazardous science lab chemicals by the case
- **They're still there!**

Is It Only in Old Schools?

- Depends
- Did they remodel an existing school?
  - May have reused old chemicals



Progress in the Pacific Northwest

- Alaska: No info about school cleanouts
- Montana: Educational work done in 2004
- Idaho: Significant work done in 2004
- Oregon: Major work from 2006-2011
- Washington: Major work from 1997 – 2004

King County Rehab the Lab

- Visited >90% of all secondary schools
- Shipped 50% of the chemicals we saw
- Removed 40 tons of lab chemicals
- Cost $535,000 plus inspector's labor
- $81,000 to deactivate potential explosives
  - Found in 75% of high schools
- Removed 585 lbs mercury

Sounds Like Good Progress!

- We've helped 600 schools
- Out of over 3,200 secondary schools
- 2,600 secondary schools haven't been inspected
- We have a long way to go & shrinking budgets

Progress Elsewhere

- Iowa – 0ver 40 tons removed
- Vermont – 11 tons removed
- Minnesota over 1,000 schools helped
- Massachusetts statewide cleanouts
- Los Angeles schools
- Central Florida and the Keys
- Individual school districts across the US

Clean Sweep NY 1,887 participants 1,059,344 pounds collected

How Can California HHW Help?

Schools Need Outside Help

- Improved awareness of hazards
- Help with organizing storage
- Separation of needed & unneeded
- Instructions on proper disposal
- Financial assistance

A Seattle High School chemistry stockroom

Just collect what's identified for disposal?

- Teacher marked this box of unknowns for disposal. Everything else "Needs to stay"

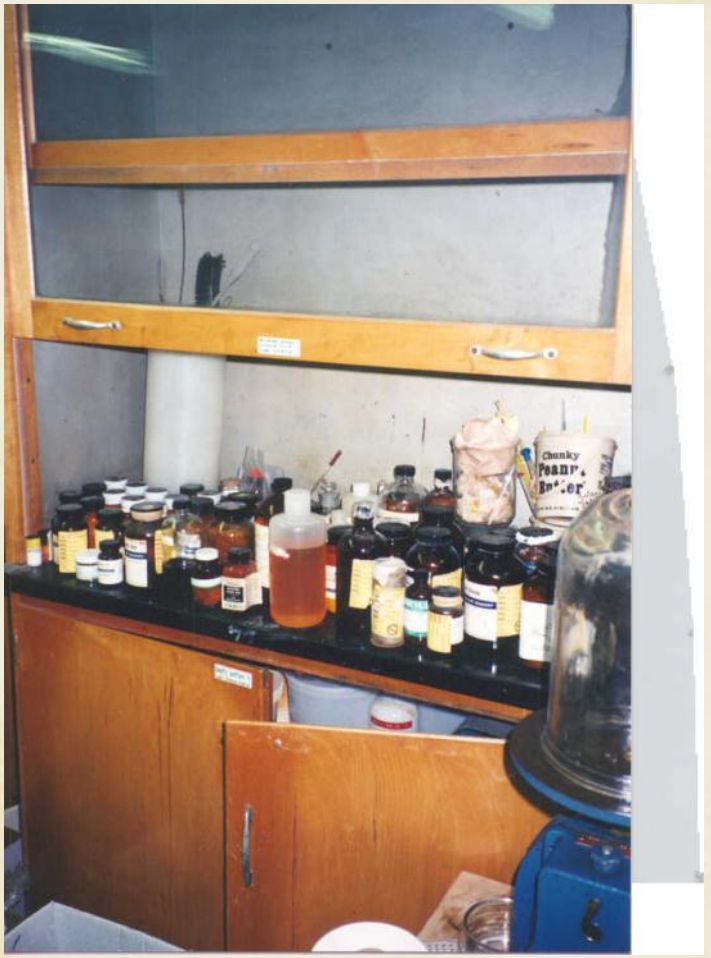
After I worked with the teacher, this was shipped & the bomb squad was called

Collector Mentality

- "What needs disposal?"
- You then collect it
- Process it
- Dispose of it
- Safely, legally & securely

Inspector Mentality

- Do you use this chemical?
- How much do you need?
- Are you aware of the hazards?
- Let's get rid of unneeded potential liabilities

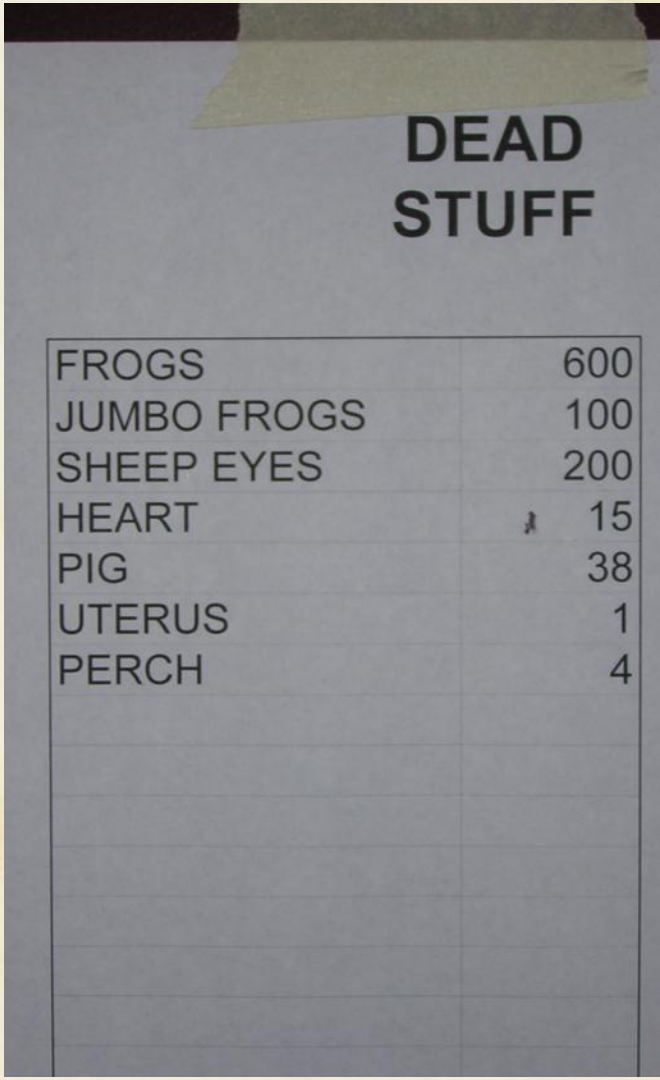


Partnerships

- Insurance Providers
- Risk Managers
- Grant-issuing Agencies
- Local HHW/CESQG Collection Programs
- School Boards
- NSTA (national science teachers association)
- School District Maintenance Managers

Rehab the Lab Has Tools to Help

- Shelf storage pattern
- Safer lab curriculum
- Training videos
- School chemicals database



Storage Pattern for Chemicals Where Space is Limited

Inorganic Reactives & Metals (I-1, I-10) Sulfur, Phosphorus, Metals, Hydrides (Store away from any water.)	**Organic Toxins (O-5, O-7)** Epoxy Compounds, Isocyanates, Sulfides, Polysulfides
Inorganic Salts (I-2) Halides, Sulfates, Sulfites Thiosulfates, Phosphates, etc.	**Organic Reactives #6** Peroxides, Azides, etc.
Inorganic Oxidizers (I-3, I-6, I-8) Nitrates, Nitrites, Borates, Chromates, Manganates, Permanganates, Chlorates, Chlorites, Peroxides	**Flammable Storage Cabinet (O-2, O-3, O-4, O-8 & concentrated organic bases)** Alcohols, Glycols, Phenol, Hydrocarbons, Esters, Ethers, Propionic Acid, Formic Acid, Acetic Acid, Lactic Acid
Inorganic Corrosive Bases (O-4) (Dry Chemicals) Dry Hydroxides, Oxides Silicates, etc.	**Dry and Dilute Organic Acids & Anhydrides (O-1)** Citric Acid, Anhydrides, Peracids, etc.
Inorganic Poisons I-5 and I-7 Arsenates, Cyanides, Sulfides, Selenides, Carbides, etc.	**Miscellaneous** Vinegar, Vegetable oils, Dyes, Stains, Household Peroxide, Agars, Sugars, Gels
Corrosive Base Storage Cabinet Liquid Hydroxides, Oxides Silicates, etc.	**Corrosive Acid Storage Cabinet** Inorganic Acids Nitric acid segregated from others

School Chemicals Database
Info on 1037 Chemical Compounds

Search: Search grid fields here Go Clear Expo

1 2 3 4 5 6 7 8 9 10 ... >> | (View All) | ...You are viewing pag

Chemical Name	Acute Exposure Hazard	Chronic Exposure Hazard	Environmental Toxicity	Hazard Rank	Minimum Grade Level Restrictions
Abscisic Acid	No acute toxicity data reported	No confirmed human disease-related or reproductive hazard data reported	No fish toxicity data	1	Elementary demonstrations only
Acetal	Explosive. Peroxide forming compound. Flammable. Slightly toxic by ingestion & skin contact. Irritant.	No confirmed human disease-related or reproductive hazard data reported	No fish toxicity data	5	Ban Candidate
Acetaldehyde	Explosion risk from peroxide formation. Flammable. Slightly toxic by inhalation, ingestion and skin contact. Irritant to eyes.	Liver function impairment	Toxic to fish	5	Ban Candidate
Acetamide	Slightly toxic by ingestion	No confirmed human disease-	Non-toxic to fish	2	Junior High

school chemical list

About 84,800,000 results (0.15 seconds)

Everything
Images
Videos

Hazardous **Chemicals** in **Schools** - Local Hazardous Waste Management ...
Home >> Resources for Schools >> **Schools Chemical List** ... Chronic lung impairment, Non-toxic to fish, 2, Middle School, O-1, Stoichiometry. Mole ratio. ...
www.lhwmp.org › Home › Resources for Schools - Cached

HAZARDOUS CHEMICALS IN SCHOOLS

Home >> Resources for Schools >> Schools Chemical List

--- Download results as... ---

BAN CANDIDATE

Page 1 of 23 | 227 records |

Chemical Name	Acute Exposure Hazard	Chronic Exposure Hazard	Environmental Toxicity	Hazard Rank	Lowest Grade Level Allowed
Acetal	Explosion risk from peroxide formation. Flammable. Slightly toxic by ingestion & skin contact. Irritant.	No confirmed human disease-related or reproductive hazard data reported	No fish toxicity data	5	Ban Candidate
Acetaldehyde	Explosion risk from peroxide formation. Flammable. Slightly toxic by inhalation,	Liver function impairment	Toxic to fish	5	Ban Candidate

Haz Rankings Link to Grade Levels

- Hazard Rank **0** = safe for all grades
  - 26 chemicals, e.g. Vinegar, Sugar, Starch
- Hazard Rank **1** = elementary demos & above
  - 19 chemicals e.g. mineral oil, rubbing alcohol
- Hazard Rank **2** = junior high & above
  - e.g. cobalt nitrate, ethanol, gram's iodine stain
- Hazard Rank **3** = high school & above
  - e.g. concentrated acids & bases, hexane

Haz Rankings Link to Grade Levels

- Hazard Rank **4** = advanced placement chemistry
  - 119 chemicals with limited utility & high hazards
  - Requires chemical hygiene plan & approval
  - e.g. Formalin, lead chloride, bromine water
- Hazard Rank **5** = ban candidates
  - 227 chemicals w/ no reported usefulness, high hazards and easy exposure routes
  - e.g. Arsenic, pure cyanide, mercury, explosives

Provide Tips for Inventorying

- Do it electronically
- Track as full containers
- Put empty bottles in the restock box
- If replaced, no change

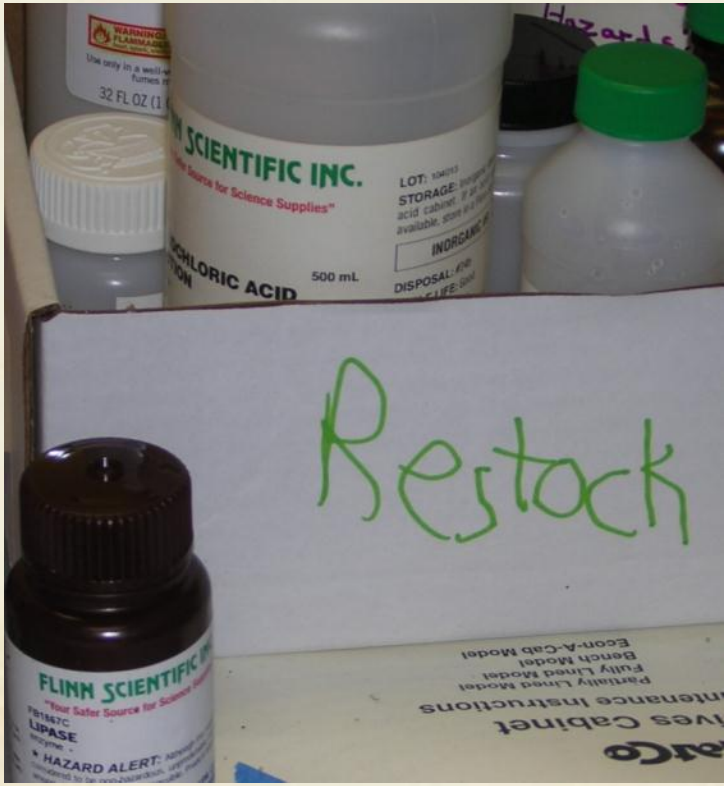
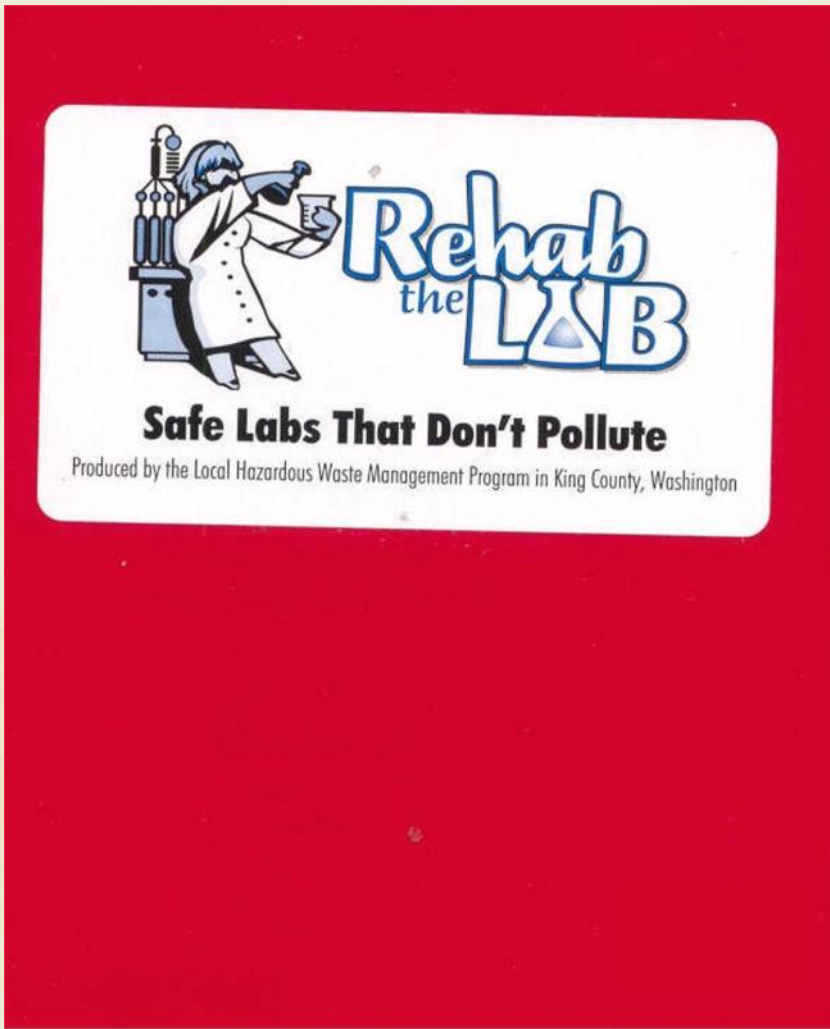


Photo: Dave Waddell

Less Hazardous Labs

- 10 teacher and student labs provided
- Authored by high school science teacher



HHW Programs & Schools

Oregon System

- Portland HHW staff did a previsit
- Assessed basic need, if warranted…
- Inspector visited, with HHW staff
- Right side good, left side bad
- Labpack as we go
- Brought back to HHW site for processing

How Can Schools Meet CESQG?

- When were these generated?

Trained Staff Screen Chemicals

Left Side Bad, Right Side Good

Ban Candidates
Their first priority for removal

- High hazard
- Not sold by Flinn, Carolina Bio Supply, etc
- Unnecessary per WSTA for teaching
- Already banned

Photo: Dave Waddell

Bring One Hazard Class a Month

- Under 200 pounds per trip
- Eliminates risks of incompatible reactions
- In case this happens…

Help Them Improve Chemical Storage

Photo: Dave Waddell

Looks like coca-cola… it's not

Photo: Dave Waddell

Are they making a sandwich or doing a Cat Scan?

Photos: Dave Waddell

Four Primary Goals

- Reduce unneeded inventory
- Keep things from degrading
- Keep incompatibles apart
- Protect human health & environment

Photo by Becky Wehrman – Used with permission

Metal acid cabinets look nice

Photo: Dave Waddell

Until you open them

Photo: Dave Waddell


Acetic Anhydride
Reagent ACS
CORROSIVE
Science Kit
& Boreal Laboratories
INV #6
ACETIC ACID
GLACIAL
CH3COOH
LOT KPLL
AR
POISON
Mallinckrodt
ACETIC ACID
GLACIAL
CH3COOH
AR
ANALYTICAL REAGENT
POISON

$1,300
worth of rust
in 7 years

I’m a big fan of SciMatCo cabinets

- Prefer “Acid” or “Base” to “Corrosive”
- Wood w/ plastic hinge
- Spill containment trays
- Dividers (bottom one)

Photo: Dave Waddell

Address Questionable Disposal


CHEMICAL DUMP ONLY

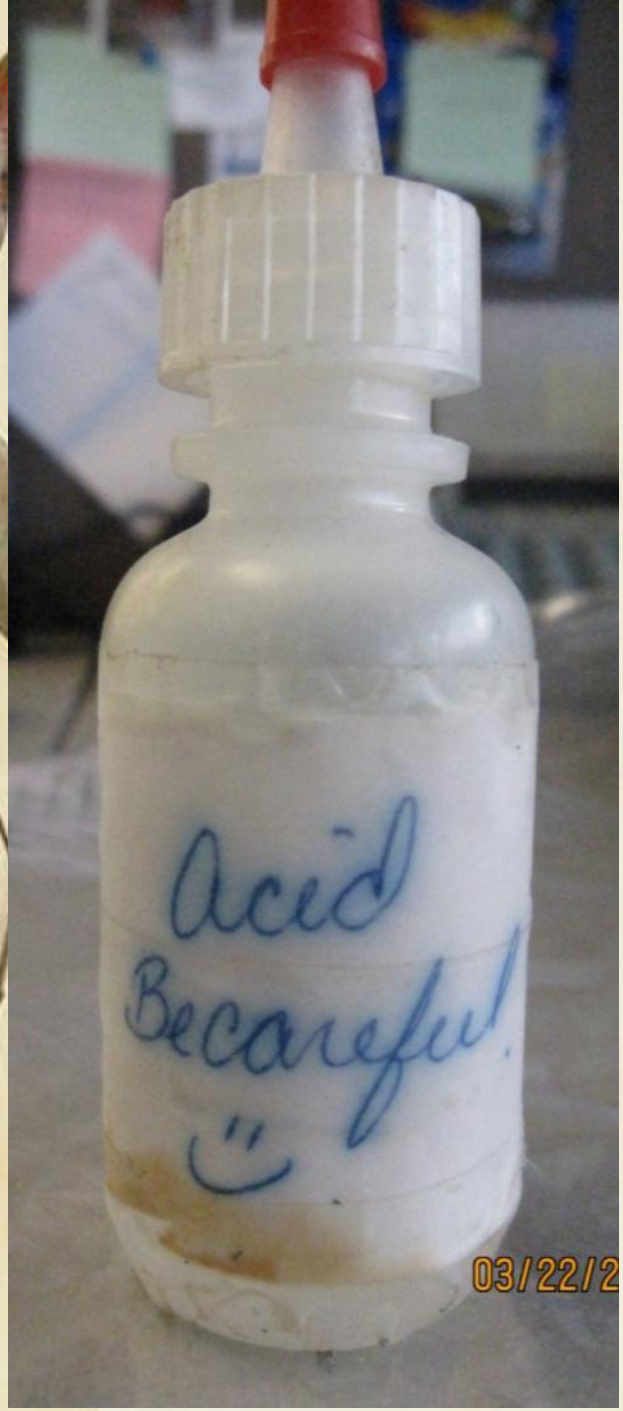
Art Department Lead Glazes

I love school chemical labels

Photo: Dave Waddell

Not appropriate, helpful or accurate

Photo: Dave Waddell



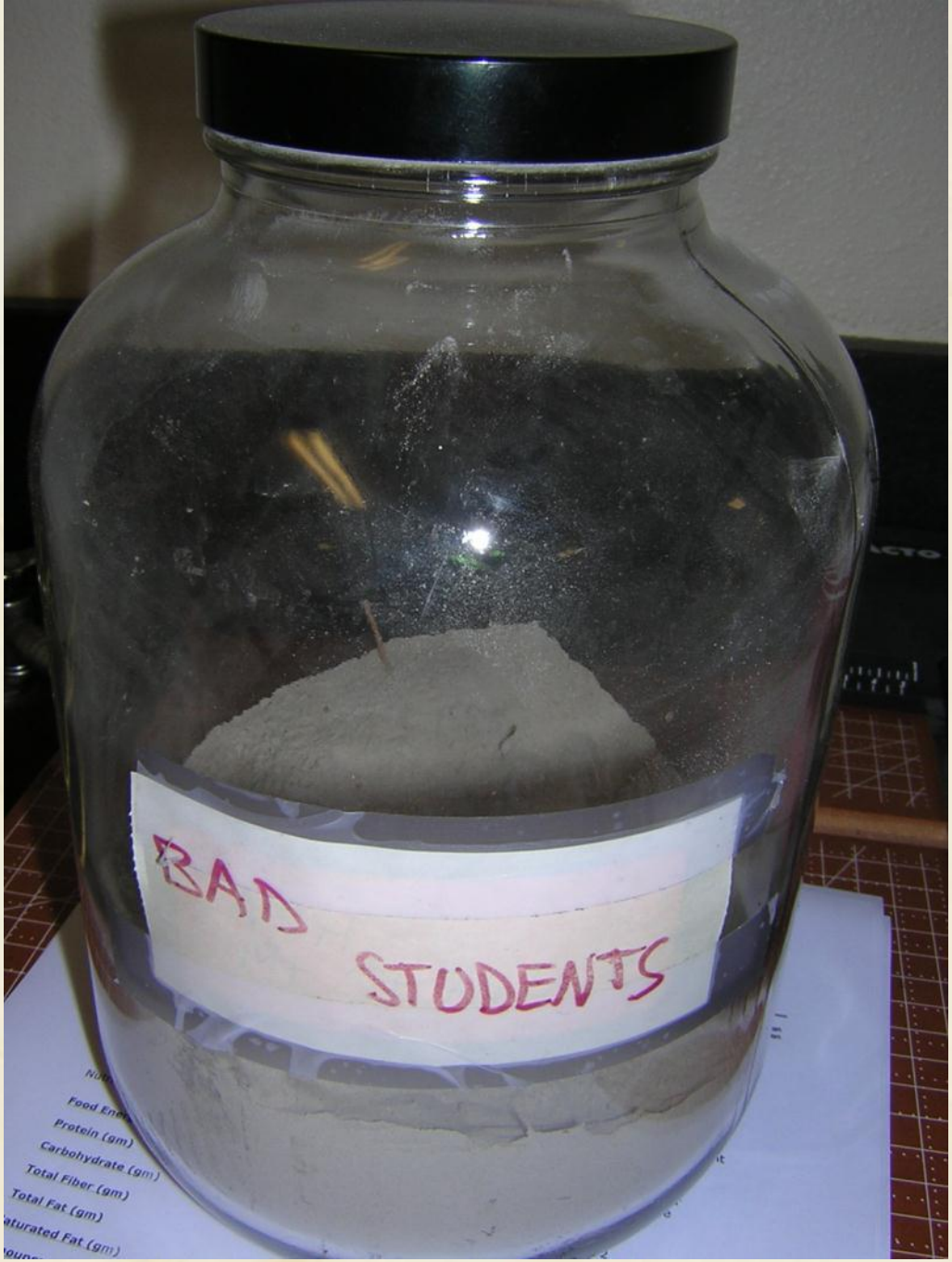
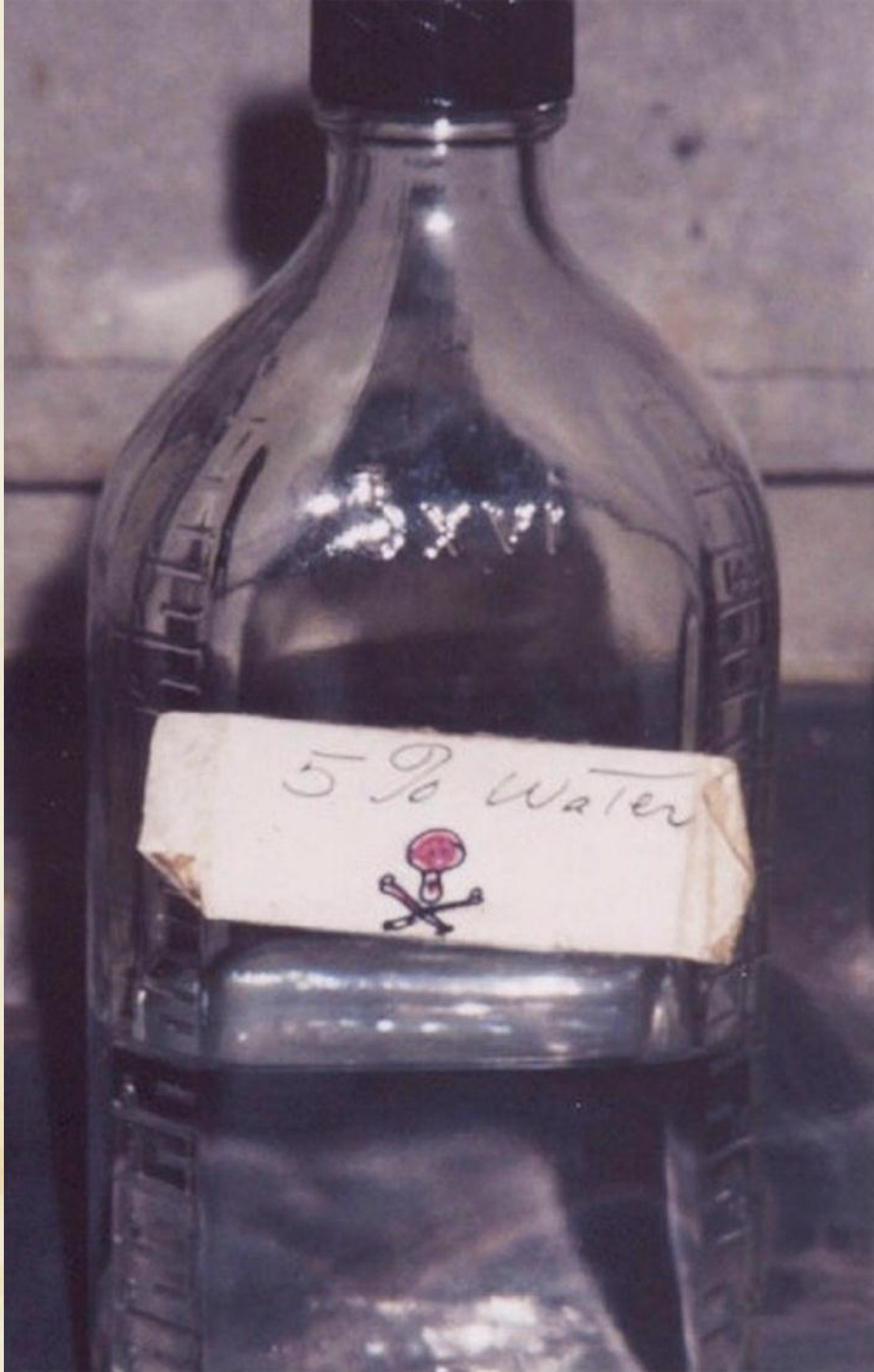


Photo: Dave Waddell


METHOL
Something


5% Water

Link With School Insurers

- Paul from Canfield joined me on 7 cleanouts
- Washington school insurers offer 5% discount on school liability rates
- **IF** they act on Rehab the Lab site visit guidance

Need To Convince People? Use photos and scary stories

This Is A Serious Problem

- It needs our participation & assistance
- How can you help?

Thanks for Letting Me Join You!