SUGGESTED CHEMICAL STORAGE PATTERN

Storage of laboratory chemicals presents an ongoing safety hazard for school science departments. There are many chemicals that are incompatible with each other. The common method of storing these products in alphabetical order sometimes results in incompatible neighbors. For example, storing strong oxidizing materials next to organic chemicals can present a hazard.

A possible solution is to separate chemicals into their organic and inorganic families and then to further divide the materials into related and compatible families. Below is a list of compatible families. On the next page you will find this family arrangement pictured as shelf areas in your chemical stores area. The pictured shelf arrangement will easily enable you to rearrange your inventory into a safer and more compatible environment.

Inorganic

1. Metals, Hydrides
2. Acetates, Halides, Iodides, Sulfates, Sulfites, Thiosulfates, Phosphates, Halogens
3. Amides, Nitrates (except Ammonium Nitrate), Nitrites, Azides
4. Hydroxides, Oxides, Silicates, Carbonates, Carbon
5. Sulfides, Selenides, Phosphides, Carbides, Nitrides
6. Chlorates, Bromates, Iodates, Chlorites, Hypochlorites, Perchlorates, Perchloric Acid, Peroxides, Hydrogen Peroxide
7. Arsenates, Cyanides, Cyanates
8. Borates, Chromates, Manganates, Permanganates
9. Acids (except Nitric) (Nitric Acid is isolated and stored by itself.)
10. Sulfur, Phosphorus, Arsenic, Phosphorus Pentoxide
11. Inorganic miscellaneous

Organic

1. Acids, Amino Acids, Anhydrides, Peracids
2. Alcohols, Glycols, Sugars, Amines, Amides, Imines, Imides
3. Hydrocarbons, Esters, Aldehydes, Oils
4. Ethers, Ketones, Ketenes, Halogenated Hydrocarbons, Ethylene Oxide
5. Epoxy Compounds, Isocyanates
6. Peroxides, Hydroperoxides, Azides
7. Sulfides, Polysulfides, Sulfoxides, Nitriles
8. Phenols, Cresols
9. Dyes, Stains, Indicators
10. Organic miscellaneous

NOTE: If you store volatile materials (ether, hydrocarbons, etc.) in a refrigerator, the refrigerator must be explosion-proof. The thermostat switch or light switch in a standard refrigerator may spark and set off the volatile fumes inside and thus cause an explosion.

Surely this list is not complete and is intended only to cover the materials possibly found in an average school situation. This is not the only method of arranging these materials and is only offered as a suggestion.

See the next three pages for detailed inventory and storage steps you might follow to vastly improve the safety profile of your chemical storage.
**SUGGESTED SHELF STORAGE PATTERN—ORGANIC**

**ORGANIC #2**
Alcohols, Glycols, Sugars, Amines, Amides, Imines, Imides
(Store flammables in a dedicated cabinet.)

**ORGANIC #3**
Hydrocarbons, Oils, Esters, Aldehydes
(Store flammables in a dedicated cabinet.)

**ORGANIC #4**
Ethers, Ketones, Ketenes, Halogenated Hydrocarbons, Ethylene Oxide
(Store flammables in a dedicated cabinet.)

**ORGANIC #5**
Epoxy Compounds, Isocyanates

**ORGANIC #6**
Peroxides, Azides, Hydperoxides

**ORGANIC #7**
Sulfides, Polysulfides, etc.

**ORGANIC #8**
Phenols, Cresols

**ORGANIC #9**
Dyes, Stains, Indicators
(Store alcohol-based solutions in flammables cabinet.)

**MISCELLANEOUS**

If possible, avoid using the floor.

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**How To**

**Maximize Storage Space**

If shelf space is a problem, you are permitted to place more than one compatible chemical family on a shelf. Make sure you either have a physical divider or leave a 3" space between each family. This will maximize your tight shelf space while keeping each compatible chemical family separate from one another.

See page 1004 for complete instructions on organizing your chemical stores area.
SUGGESTED SHELF STORAGE PATTERN—INORGANIC

INORGANIC #10
Sulfur, Phosphorus, Arsenic, Phosphorus Pentoxide

INORGANIC #2
Halides, Sulfates, Sulfites, Thiosulfates, Phosphates, Halogens, Acetates

INORGANIC #3
Amides, Nitrates (not Ammonium Nitrate), Nitrites, Azides
(Store Ammonium Nitrate away from all other substances—ISOLATE IT!)

INORGANIC #1
Metals & Hydrides
(Store away from any water.)
(Store flammable solids in flammables cabinet.)

INORGANIC #4
Hydroxides, Oxides, Silicates, Carbonates, Carbon

INORGANIC #7
Arsenates, Cyanides, Cyanates
(Store away from any water.)

INORGANIC #5
Sulfides, Selenides, Phosphides, Carbides, Nitrides

INORGANIC #8
Borates, Chromates, Manganates, Permanganates

INORGANIC #6
Chlorates, Bromates, Iodates, Chlorites, Hypochlorites, Perchlorates, Perchloric Acid, Peroxides, Hydrogen Peroxide

MISCELLANEOUS

If possible avoid using the floor.

Storage Suggestions
1. Avoid floor chemical storage (even temporary).
2. No top shelf chemical storage.
3. No chemicals stored above eye level.
4. Shelf assemblies are firmly secured to walls. Avoid island shelf assemblies.
5. Provide anti-roll-off lips on all shelves.
6. Ideally, shelving assemblies would be of wood construction.
7. Avoid metal, adjustable shelf supports and clips. Better to use fixed, wooden supports.
8. Store acids in dedicated acid cabinet. Store nitric acid in that same cabinet only if isolated from other acids. Store both inorganic and some organic acids in the acid cabinet.
10. Store severe poisons in a dedicated poisons cabinet.

OTHER STORAGE SUGGESTIONS ARE CONTAINED THROUGHOUT THIS CATALOG/REFERENCE MANUAL.

INORGANIC #9
Acids, except Nitric
(Except are best stored in dedicated cabinets.)

Store nitric acid away from other acids unless your acid cabinet provides a separate compartment for nitric acid.