

Quick Safety Information:

Don't eat these things! Wear goggles to avoid losing your eyeballs, gloves to keep the chemicals from irritating your skin, and protect your table with a plastic sheet. Perform experiments outdoors or near a window for maximum ventilation.

First Aid for Chemicals: Depending on the chemical and where it went, you'll need to do different things. Sometimes inducing vomiting is the right thing to do, and other times it will only make things worse. Always contact Poison Control FIRST: 1 (800) 222-1222.

This is the quick-reference information data sheet on the chemicals in your science packet. If you need more information, including safety information, check online at: <http://www.cdc.gov/niosh>.

Calcium chloride is an ionic compound of calcium and chlorine. It is highly soluble in water and deliquescent (readily absorbs moisture). Because of its hygroscopic nature, it must be kept in tightly-sealed containers. This is a moderately toxic chemical, one to be extra careful with. Avoid contact with the skin, as it can be irritating. Wash hands thoroughly after handling and avoid breathing dust. If inhaled, step outside to get fresh air. For eyes, flush immediately with plenty of water for 15 minutes. If spilled, wash all clothing before reuse. If swallowed, induce vomiting as directed by poison control 1 (800) 222-1222. Store in a cool, dark place in sealed container. Dispose of in the trash.

Cobalt Chloride This is the sparkly magenta compound in your set, normally used as an indicator for water. Will turn red at room temperature, and blue when heated. This is a moderately toxic chemical, one to be exceptionally careful with. Avoid contact with the skin, as it can be irritating. Wash hands thoroughly after handling and avoid breathing dust. If inhaled, step outside to get fresh air. For eyes, flush immediately with plenty of water for 15 minutes. If spilled, wash all clothing before reuse. If swallowed, contact poison control 1 (800) 222-1222. Store in a cool, dark place in sealed container. Dispose of in the trash.

Ferric Ammonium Sulfate *DANGER!* THIS IS THE ONE TO WATCH OUT FOR IN THIS EXPERIMENT. This

chemical compound contains violet-hued crystals. Avoid contact with the skin, as it can be irritating. Wash hands thoroughly after handling and avoid breathing dust. If inhaled, step outside to get fresh air. For eyes, flush immediately with plenty of water for 15 minutes and lift upper and lower eyelids occasionally while flushing. If spilled, wash all clothing (including shoes) thoroughly before reuse. If swallowed, give several glasses of water to dilute and contact poison control 1 (800) 222-1222. Store in a cool, dark place in sealed container. Dispose of in the trash.

Guar gum, also called guaran, is a galactomannan. It is primarily the ground endosperm of guar beans. The guar seeds are dehusked, milled and screened to obtain the guar gum. It is typically produced as a free flowing, pale, off-white colored, coarse to fine ground powder. This compound is stable and commonly used in food, and does not produce any fumes when mixed as directed. Do not inhale the dust. Store in a cool, dark place. Dispose of in the trash.

Phenolphthalein is a chemical compound that is colorless in acidic solutions and pink/purple in basic solutions. Used to test for pH. Avoid contact with the skin, as it can be irritating. Wash hands thoroughly after handling and avoid breathing dust (which can cause excessive sneezing). If inhaled, step outside to get fresh air. For eyes, flush immediately with plenty of water for 15 minutes. Very cathartic in small amounts. If swallowed, contact poison control immediately 1 (800) 222-1222. Store in a cool, dark place in sealed container. Dispose of in the trash.

Polyvinyl alcohol has excellent film forming, emulsifying, and adhesive properties. It is also resistant to oil, grease and solvent. It is odorless and nontoxic. Store in a cool, dark place. Dispose of in the trash.

Potassium Iodide This is a colorless salt that can be dissolved in water to form a saturated solution. Older research shows it as effective as a radiation protective (known as thyroid blocking). Avoid contact with the skin, as it can be irritating. Wash hands thoroughly after handling and avoid breathing dust. If inhaled, step outside to get fresh air. For eyes, flush immediately with plenty of water for 15 minutes. If swallowed, contact poison control 1 (800) 222-1222. Store in a cool, dark place in sealed container. Dispose of in the trash.

Sodium Bicarbonate is another name for baking soda. Because it has long been known and is widely used, the salt has many other names including sodium hydrogen carbonate, sodium bicarb, baking soda, bread soda, cooking soda, bicarb soda, saleratus or bicarbonate of soda. Sodium bicarbonate is a white solid that is crystalline but often appears as a fine powder. Commonly used in food. Store in a cool, dark place. Dispose of in the trash.

Sodium Carbonate (also known as washing soda or soda ash), Na_2CO_3 , is a sodium salt of carbonic acid. It is a stable compound. Treat it as you would laundry detergent. Store in a cool, dark place. Dispose of in the trash.

Sodium Ferrocyanide *DANGER! THIS IS THE ONE TO WATCH OUT FOR* in your chemistry set. It is a yellowish compound that dissolves in water (although insoluble in alcohol). **Produces lethal hydrogen cyanide gas when combined with acids.** DO NOT mix this with any other chemical in your set unless we show you how. Avoid contact with the skin (irritant). Wash hands thoroughly after handling and avoid breathing dust. For eyes, flush immediately with plenty of water for 15 minutes and seek medical attention. *Extremely hazardous if ingested!* Do NOT induce vomiting. If swallowed, contact poison control 1 (800) 222-1222. Store in a cool, dark place in sealed container. Dispose of in the trash.

Sodium Sulfate is a white compound used for making laundry detergent, but scientists use it to remove trace amounts of water in carbon-based compounds. Avoid contact with the skin, as it can be irritating. Wash hands thoroughly after handling and avoid breathing dust. If inhaled, step outside to get fresh air. For eyes, flush immediately with plenty of water for 15 minutes. If swallowed, contact poison control 1 (800) 222-1222. Store in a cool, dark place in sealed container. Dispose of in the trash.

This is the active compound in reusable hand warmers. Avoid contact with the skin, as it can be irritating. Wash hands thoroughly after handling and avoid breathing dust. If inhaled, step outside to get fresh air. For eyes, flush immediately with plenty of water for 15 minutes. If swallowed, induce vomiting as directed by poison control. Store in a cool, dark place in sealed container. Dispose of in the trash.

Sodium Tetraborate, also called Borax, sodium borate or disodium tetraborate. It's a mineral and a salt of boric acid. It is usually a white powder consisting of soft colorless crystals that dissolve easily in water. Treat it as you would laundry detergent. Store in a cool, dark place. Dispose of in the trash.

Can I use my kitchen glassware with my chemistry experiments? It's better to use separate dishes for chemistry and for cooking, even if it's just for measuring ingredients. Have you ever cooked something tomato-based in a plastic bowl, such as Tupperware? If so, you know it takes serious cleaners to get the tomato stain out of the container. The plastic is relatively porous, so after you rinse your dish you can expect residual molecules of whatever you cooked to remain. Metal cookware is even more reactive. In some cases, cooks take advantage of this property to affect the foods that they prepare. For example, if you cook an acidic sauce in an iron skillet, you can increase the iron content of the food (also will corrode your pot a bit). If you whip egg whites in a copper bowl, the protein in the egg will form a complex with the copper, stabilizing the egg whites in a reaction that even alters the color of the food.

Glassware, like Pyrex, tends to rinse cleaner than wood, plastic, or metal, but you will still get some absorption into your dishes. Don't use your good dishes for any reaction involving heavy metals or any deadly poison... period. Get a cheap set of glassware and cleaning sponges/brushes to only be used for chemistry, and store it with your experiment set.

Sodium Thiosulfate Produces large amounts of heat when combined with certain liquids, including water.

OTHER DANGEROUS COMBINATIONS

Be sure to keep incompatibilities in mind when reusing containers to store other chemicals. Here are some examples of mixtures to avoid:

- Acids with cyanide salts or cyanide solution. Generates highly toxic hydrogen cyanide gas.
- Acids with sulfide salts or sulfide solutions. Generates highly toxic hydrogen sulfide gas.
- Acids with bleach. Generates highly toxic chlorine gas.
- Oxidizing acids (e.g., nitric acid, perchloric acid) with combustible materials (e.g., paper, alcohols, other common solvents). May result in fire.
- Solid oxidizers (e.g., permanganates, iodates, nitrates) with combustible materials (e.g., paper, alcohols, other common solvents). May result in fire.
- Hydrides (e.g., sodium hydride) with water. May form flammable hydrogen gas.
- Phosphides (e.g., sodium phosphide) with water. May form highly toxic phosphine gas.
- Silver salts with ammonia in the presence of a strong base. May generate an explosively unstable solid.
- Alkali metals (e.g., sodium, potassium) with water. May form flammable hydrogen gas.
- Oxidizing agents (e.g., nitric acid) with reducing agents (e.g., hydrazine). May cause fires or explosions.
- Unsaturated compounds (e.g., substances containing carbonyls or double bonds) in the presence of acids or bases. May polymerize violently.
- Hydrogen peroxide/acetone mixtures when heated in the presence of an acid. May cause explosions.
- Hydrogen peroxide/acetic acid mixtures. May explode upon heating.
- Hydrogen peroxide/sulfuric acid mixtures. May spontaneously detonate.

Dangerous Combinations: Don't *ever* combine these chemicals, as toxic fumes and lethal gases are produced:

- *Bleach with Acid Toilet Bowl Cleaners:* This mixture can result in toxic, potentially deadly fumes.
- *Bleach with Vinegar:* Vinegar is a type of acid. Toxic chlorine vapor is produced. Don't mix chlorine bleach with any acid.
- *Bleach with Ammonia:* Toxic, potentially lethal vapors (hydrochloric acid) are produced.
- *Different Brands of One Type of Product:* Don't mix different cleaners together. They may react violently, produce toxins, or become ineffective.
- *Highly Alkaline Products with Highly Acidic Products:* Acids and bases (alkalis) can react violently, presenting a splash hazard. Acids (like battery acid) and bases (like drain cleaner) are caustic and may cause chemical burns.
- *Certain Disinfectants with Detergents:* Don't mix disinfectants with 'quaternary ammonia' listed as an ingredient with a detergent. The effectiveness of the disinfectant may be neutralized.
- *Chlorine bleach* is sometimes called "sodium hypochlorite" or "hypochlorite." You will encounter it in chlorine bleach, automatic dishwashing detergents, chlorinated disinfectants and cleaners, chlorinated scouring powder, mildew removers, and toilet bowl cleaners. Do not mix products together. Do not mix them with ammonia or vinegar.

