

Chemical Safety

Chemicals are useful in many settings at home, school, or work, but when stored or handled carelessly, they can become serious hazards. One of the biggest risks is accidentally mixing chemicals, which can produce toxic fumes, fires, or even explosions. To keep everyone safe, here are some essential guidelines for proper chemical storage and handling.

- **Restrict access.** Keep chemicals out of reach of children, students, or unauthorized personnel. Use childproof locks (like [this 3D-printable lock](#)) or store them in locked cabinets.
- **Ventilation matters.** Avoid storing chemicals in poorly ventilated areas like under sinks or in closets. Choose well-ventilated spaces to prevent fume buildup.
- **Elevate when possible.** Store hazardous liquids on high shelves to reduce the risk of spills and accidental contact.
- **Keep chemicals in original containers.** Never transfer them to food or drink bottles, as this can lead to dangerous mix-ups.
- **Separate incompatible chemicals.** Acids, bases, and flammables should be stored apart to prevent reactions. Use [spill trays](#) to contain leaks (which can also be [3D printed](#)).
- **Label everything clearly.** If a chemical is transferred to a new container (e.g., for dilution), label it with the contents, hazards, and date.
- **Never mix chemicals unintentionally.** Some combinations produce deadly gases or violent reactions. Common dangers include:
 - Ammonia + bleach = chloramine gas (causes severe respiratory damage, even death). [A tragic incident](#) highlights how fatal this can be.
 - Bleach + vinegar = chlorine gas (leads to burns, coughing, and lung damage).
 - Different drain cleaners mixed together can cause explosions or toxic fumes.
- **Wear protective gear** (gloves, goggles, masks) when handling harsh chemicals.
- **Work in well-ventilated areas.** Open windows or use fans when cleaning with strong chemicals.
- **Dispose of old or unused chemicals properly.** Check local hazardous waste guidelines.
- **Have an emergency plan.** Keep a fire extinguisher nearby (Class B for flammable liquids) and know first aid for chemical exposure.
- **Train staff/students.** In workplaces and schools, ensure everyone knows chemical safety protocols and emergency procedures.

