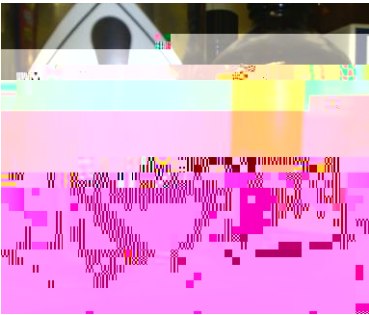
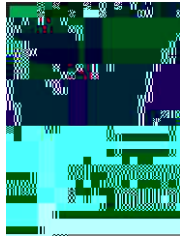


Old Definition	Old Symbol	New CLP Symbol	New CLP Number / Definition
<p>NO PREVIOUS CATEGORY: Closest match Irritant / Toxic</p>			<p>GHS-08 (New):</p> <ul style="list-style-type: none"> ○ Respiratory sensitisation ○ Germ cell mutagenicity ○ Carcinogenicity ○ Reproductive toxicity ○ specific target organ toxicity ○ Aspiration hazard
<p>CORROSIVE: Substances that can destroy living tissue. Cause damage quickly and can react violently with water or certain metals eg concentrated acids</p>			<p>GHS-05:</p> <ul style="list-style-type: none"> ○ Corrosive to metals ○ Skin corrosion ○ Severe eye damage



Chemical Reactions

What is a chemical reaction?

Chemical Reaction: *A process in which a substance decomposes, combines with other substances or interchanges with other substances.*

Before working with chemicals, assess if a reaction could occur when you mix any chemicals together. Common types of reaction that pose a health and safety risk include:

- **Exothermic:** Reactions that give out heat energy.
- **Synergistic:** The combined effect is greater than if each chemical was administered alone. For example, $2 + 2 = 20$.
- **Potentialiation:** The first harmless chemical enhances the effect of the second, eg $0 + 2 = 10$.

Of these reactions, exothermic causes the most concern as it can lead to **Runaway Reactions**:

Runaway Reaction: *When the heat produced exceeds the heat removed. The surplus heat raises the temperature of the reaction mass, causing the reaction rate to speed up to a point where the chemical reaction can no longer be controlled.*

An approximate rule of thumb - heat generation doubles with every 10°C rise in temperature.

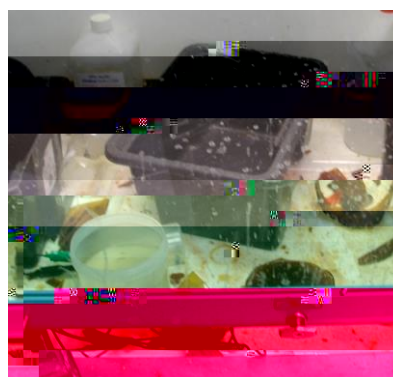
In general most chemicals can be used safely. However there are some which appear to be perfectly safe but which if not handled correctly. For example if heated above its flash point or mixed with another chemical, will react, creating harmful by-products such as fire, explosion and toxic gases. All of which can harm people, the environment and cause damage to property or other assets.

Such uncontrolled reactions can cause:

- Boiling over of the reaction mass.
- Explosions.
- Fire.
- Toxic gases / vapours / fumes.



Fire caused by a runaway reaction



Winchester jar exploded due to severe over pressure caused by rapid gas generation

BEFORE handling any chemicals:

- **RESEARCH** to understand the task, hazards associated with the chemical(s) and the necessary controls. Especially if using a mixture.
- **NEVER** rush.
- **MAKE SURE** you have everything you need to hand.
- **CHECK** equipment is clean. Contaminants can act as catalysts, causing unexpected reactions.
- **IF IN DOUBT** ask your Academic Supervisor or Lab Technician.

Finding out about Chemical Hazards

Always carry out thorough research pre-experiment in order to assess the hazards associated with a chemical(s). The following are useful sources of information:

- Product labels as discussed.
- Material Safety Data Sheets (MSDS) which are usually provided by the chemical supplier / manufacturer.
- See first page for useful MSDS sources for chemical hazard data.

MSDSs were required by the old Chemical Hazard Information & Packing Supply (CHIP) Regs that required suppliers to classify substances and give users information based on a specified classification scheme. They now fall under the scope of the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulations. REACH requires suppliers to provide information on the hazards of their substances and mixtures. This information is provided in the form of a Safety Data Sheet (SDS) which is a document that provides information on the hazards of a chemical substance and the measures that should be taken to protect health and the environment. The SDS is a key document for the safe handling and use of chemicals in the workplace. It provides information on the chemical's properties, hazards, and the measures that should be taken to protect health and the environment. The SDS is a key document for the safe handling and use of chemicals in the workplace. It provides information on the chemical's properties, hazards, and the measures that should be taken to protect health and the environment.



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COSHH Assessment

As part of any research into the chemicals to be used also consider:

Temperatures and Fire

At certain temperatures some chemicals ignite leading to fire and / or explosion. This must be considered when preparing a COSHH Assessment. Information is usually included on the MSDS - lookout for the following terms:

- **Flash Point:** The lowest temperature at which sufficient vapour is produced to form an ignitable mixture.
- **Fire Point:** The lowest temperature at which, the heat produced will enable combustion to continue after a substance is ignited.
- **Auto Ignition:** The lowest temperature at which a substance wi