The GHS Training Program

and

WHMIS 2015

Worker Handbook

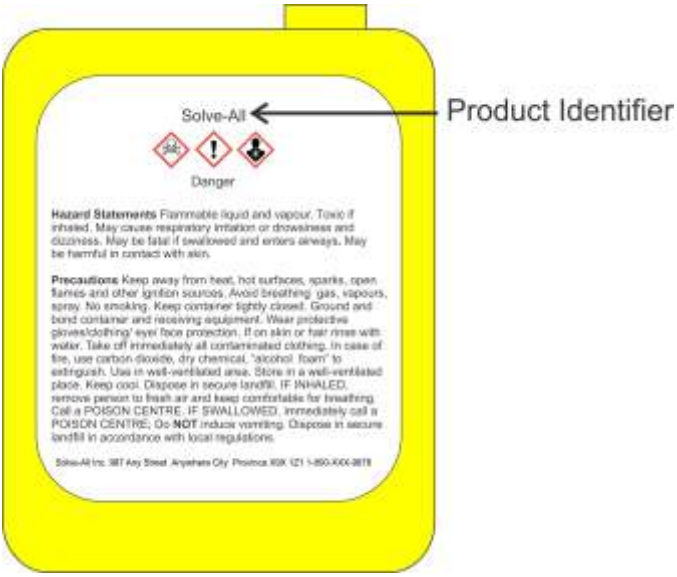
Gilda Green
Neil McManus

Training by Design Inc.
North Vancouver, British Columbia

Table of Contents

Safety Data Sheet Note: NAP = not applicable NAV = not available sample for illustration only	
Section 1 — Identification	
Product Identifier Solve-All	**Other Means of Identification** S-A999
Recommended Use general purpose solvent	**Restrictions on Use** none
Supplier Solve-All Inc. 987 Any Street Anywhere City, Province X9X 1Z1	**Telephone** 1-800-XXX-9876 **Emergency Telephone** 1-XXX-234-5678 24/7 availability

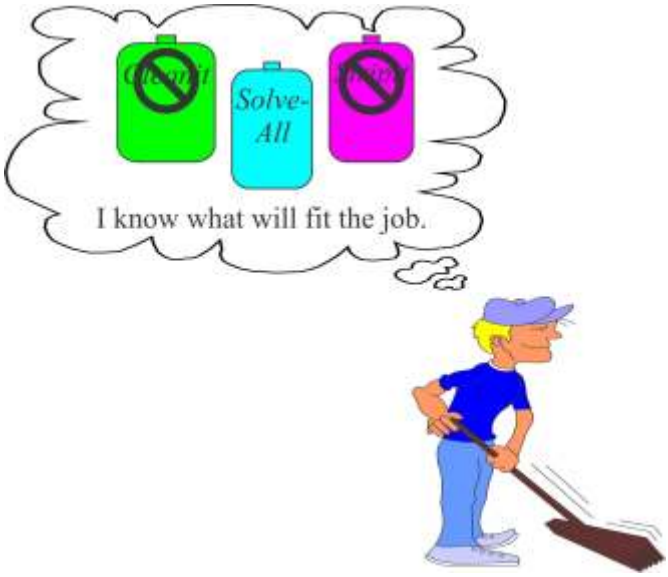
Product Identifier



The **Product Identifier** identifies the chemical product on the GHS Label and in the SDS. It can be the chemical name, generic name, brand name, trade name, code number, or code name.

Other Means of Identification can refer to a reference number or name assigned to a product by the supplier or manufacturing company.

Recommended Use and Restrictions on Use



These boxes indicate the expected use of the product and applicable restrictions on use. The use presumed by the author of the SDS may not match the actual one. The importance of comparing the hazard between actual and presumed conditions cannot be overstated. Information presented later in the SDS reflects the level of hazard suggested by presumed use of the product. If the circumstances of actual use are too different, precautionary measures may not apply. Unusual uses of the product could result in exposures that differ considerably from those expected.

Supplier

The **Supplier** is the company from which the product is purchased. The Manufacturer is the actual manufacturer of the product. The Supplier can be the Manufacturer, Processor, Distributor, Packager, Importer, or Seller.

Emergency Telephone Number

The emergency telephone number provides a means of contacting the Manufacturer or Supplier during an emergency situation.

Chemical Manufacturers, Suppliers, Distributors, and Importers use emergency telephone numbers in different ways. In large organizations during normal business hours, this number could reach a plant medical centre or industrial hygienist or safety professional. In smaller organizations, this number could reach a nurse or lab chemist or regulatory affairs office. After normal hours, the number may reach the Call Centre of a contractor that provides an information service. The contractor may have little ability to provide assistance beyond the information provided in the SDS.

QUESTIONS AND ANSWERS

1. The Product Identifier in the SDS and the Label of a container do not match. What should we do?

The Product Identifier is the link between the SDS, Label, and the hazardous ingredients. If a mismatch has occurred, report this to your supervisor immediately. Then your supervisor should immediately contact the company named in the SDS to determine whether a mistake has occurred. Do not use the chemical product until the problem is corrected.

2. The Supplier identification section in the SDS indicates a distributor's name. Is this a problem?

Not necessarily. What is important is a reliable source of readily available information in case of accident.

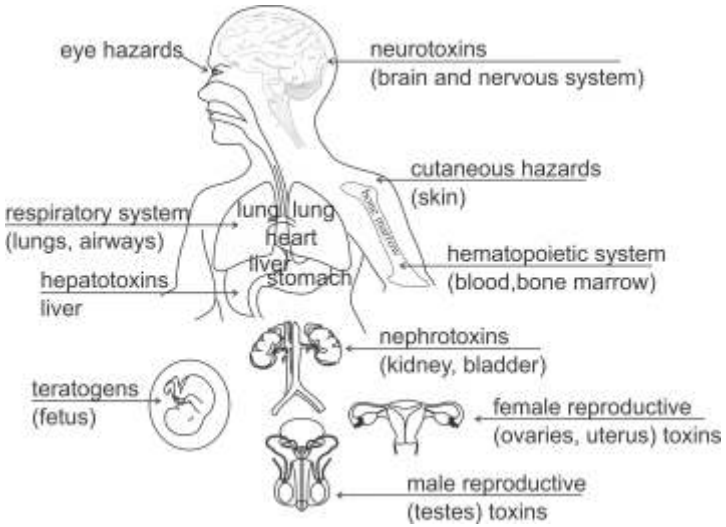
3. The Product Identifier in the SDS of the hazardous chemical says Trade Secret. What steps should we take?

Under the GHS, the term for this situation is Confidential Business Information (CBI). This is a term not specified in the WHMIS 2015 Regulation. Local regulators may create speicific requirements for disclosure to ensure that the Health and Safety of users is not compromised.

Check the SDS for disclosure of properties and effects of the chemical. If this information is not present or is inadequate, report this to your supervisor at once. Your supervisor will then follow-up through the agent who prepared the SDS. Do not use the chemical product until the appropriate information is provided.

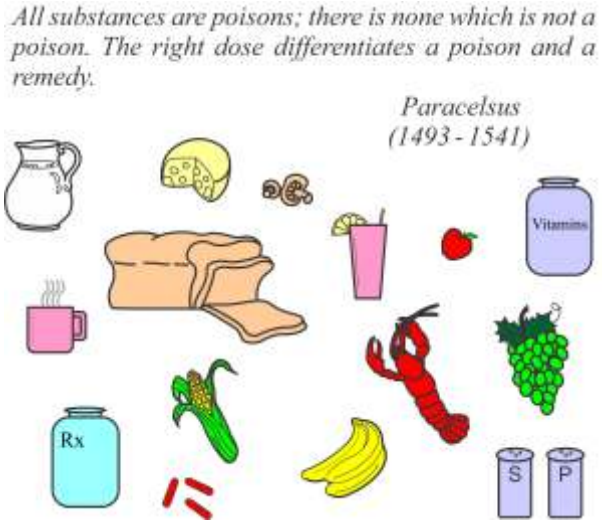
Section 11 — Toxicological Information			
Route of Exposure		**Carcinogenicity** not known	**Germ Cell Mutagenicity** not known
Inhalation	✓	Inhalation Can cause irritation of nose, throat, and lungs.	
Ingestion	✓	**Ingestion** Coughing and choking almost immediately followed by vomiting, sore throat, and burning sensation in mouth.	
Skin Contact	✓	**Skin** Causes dry skin.	
Eye Contact	✓	Serious Eye Damage/Eye Irritation eye irritant	
Respiratory or Skin Sensitization none observed			**Reproductive Toxicity** none known
Aspiration Toxicity can occur if product is ingested and enters airways; pulmonary edema (fluid in lungs)			**Biohazardous Infectious Material** (WHMIS 2015 only) NAP
Specific Target Organ: Single Exposure (Acute Exposure) headache, dizziness, confusion. Death can occur at high concentrations.			**Specific Target Organ: Repeated Exposure (Chronic Exposure)** possible damage to liver, kidneys; possible effects on nervous system.
Delayed and Immediate effects, and Chronic Effects from Short and Long-Term Exposure not known			
Numerical Measures of Toxicity			
LD_{50} (Species/Route) NAP			**LC_{50} (Species)** 1340 ppm (cat); 1980 ppm (rat)

Toxicology



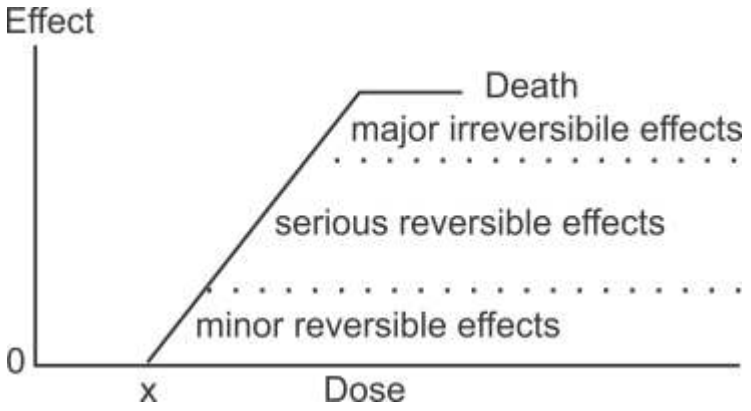
Toxicology is the study of the poisonous effects of chemical and biological substances and physical agents on individual organs and tissues, as well as the whole animal. Hazardous chemicals often affect specific orgrans.

All Substances are Poisonous



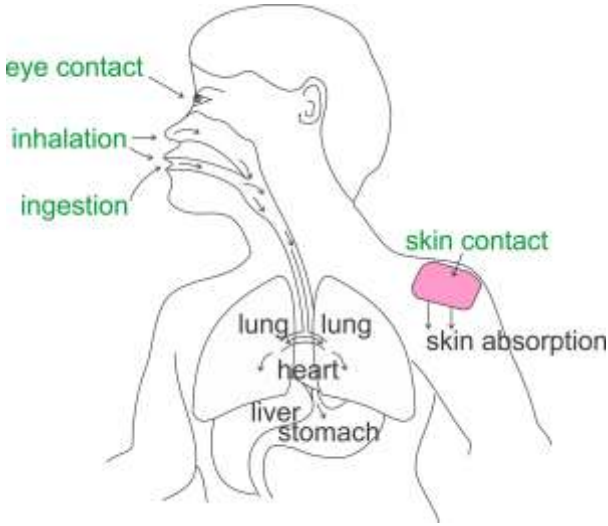
Anything that we consume can be poisonous depending upon the dose (amount) that enters the body.

Dose/Effect Curve



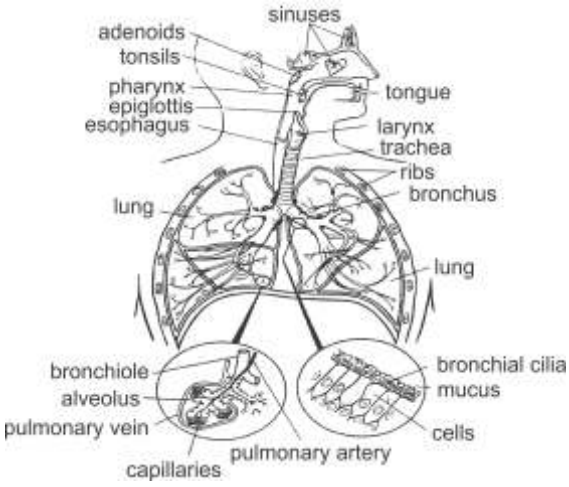
At dose x the first measurable effect occurs. As the dose increases the effects become more serious, and possibly irriversible. The most serious effect is death.

Route of Exposure



Routes of exposure are worded in green. Routes of entry are worded in black.

Inhalation
The Respiratory System

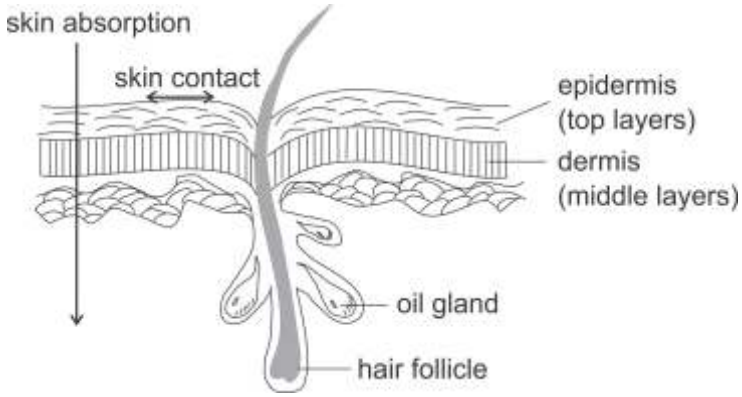


The respiratory system has a surface area of 70 m^2 (about 750 ft ^{2}), about the size of a tennis court.

Ingestion
The Stomach

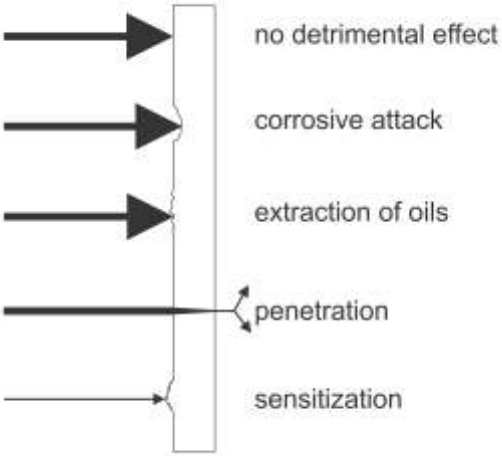
The interior of the stomach is a hostile, extremely acidic environment. Many substances undergo chemical change in the stomach before absorption into the body. Because of this, the actual substance that causes the damage may not be the one taken in by mouth.

The Skin



The skin consists of several layers. **Skin Contact** refers to the ability of a chemical to enter the body by damaging the skin. **Skin Absorption** refers to the ability of a chemical to enter the body by passing through intact skin. Skin surface is about 1.8 m^2 (20 ft^2).

Skin Permeation

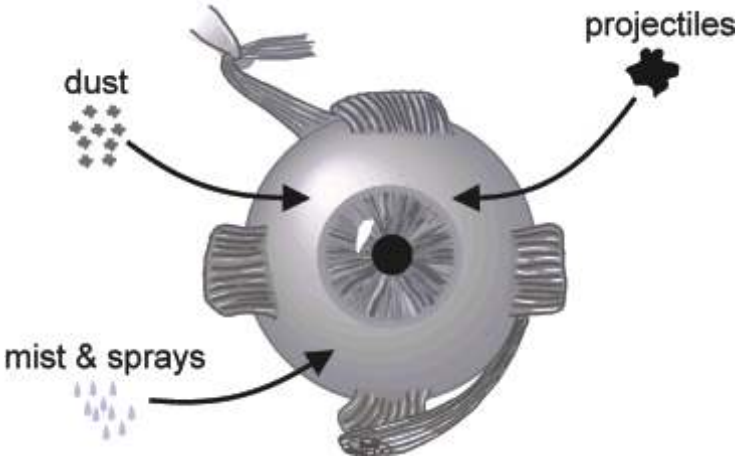


Above are examples of substances that can permeate the skin. Note the small amount of substance needed to trigger an allergic response once sensitization has occurred.

Skin Corrosion

A **Corrosive** chemical causes visible destruction of or irreversible alterations in living tissue by chemical action at the sire of contact.

Eye Contact

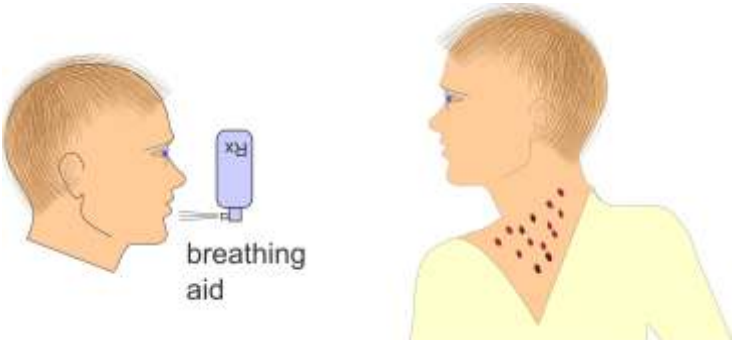


Eye contact refers to the ability of the hazardous chemical product to enter the body by a path involving the eye or ability to damage the eye. Some substances dissolve into the fluids that bathe the eye. Others attack the membranes that surround the eye. The unprotected eye also is especially susceptible to attack by corrosives or irritants.

Skin Irritation
Serious Eye Irritation

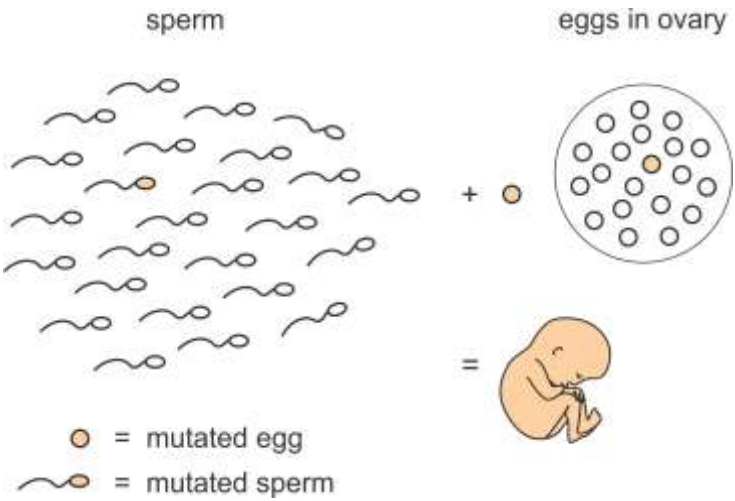
An **Irritant** causes reversible inflammation of living tissue by chemical action at the site of contact. The irritant effect is not corrosive.

Sensitization



A **Sensitizer** causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure.

Germ Cell Mutagenicity



A mutation to a single sperm or a single egg is not likely to be passed on to a child.

Germ Cell Mutagenicity

charred substances
in food

caffeine and
theobromine (tea)

some plant products

Common substances in the diet contain mutagens.

Carcinogenicity

unbalanced diet

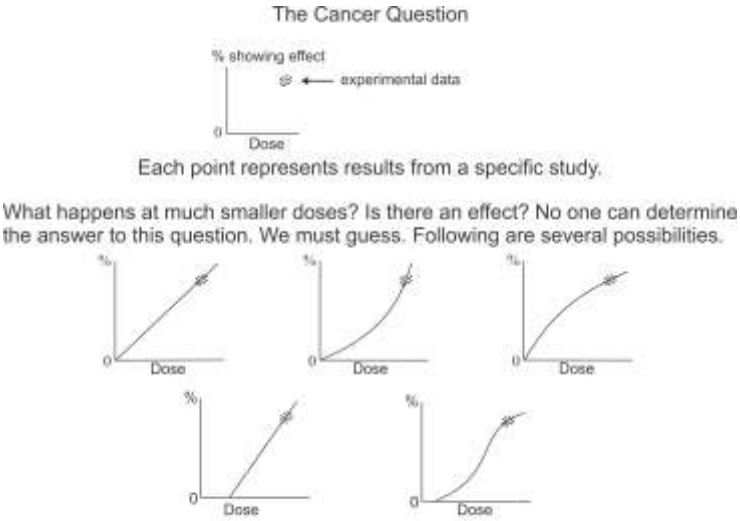
excess alcohol

smoking

suntanning

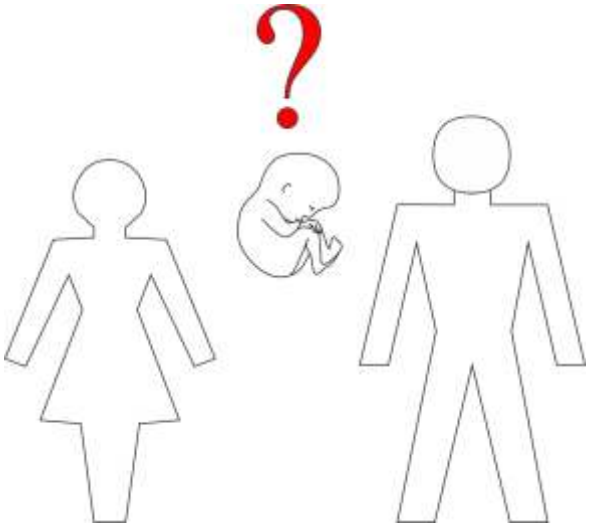
Many experts believe that 80% of cancer is caused by unbalanced diet, excess alcohol, smoking, and suntanning. Aging, genetics, and occupation account for the remaining incidence.

Carcinogenicity Curves



Science cannot predict what happens at low doses.

Reproductive Toxicity

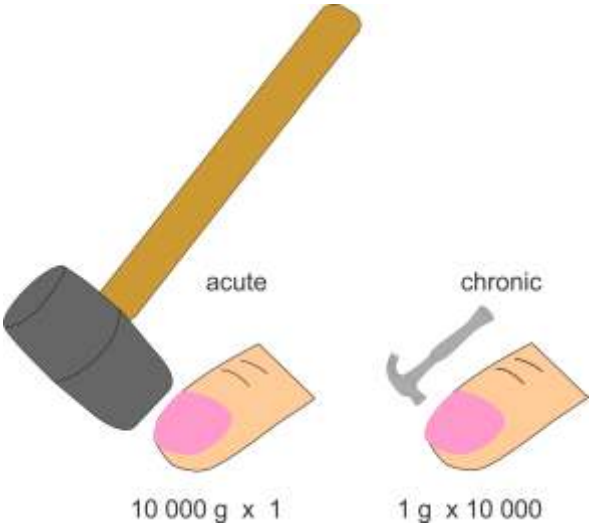


Some substances interfere with reproductive processes in women or men or both. Reproductive effects include adverse effects on the reproductive capacity of a person or even sterility.

Biohazardous Infectious Material (WHMIS 2015 only)

Biologically Active Material Found in Some Products	
Life Forms	Contents of Living Cells
• bacteria • fungi • yeasts • mould • virus • sporozoa • higher life forms	• enzymes • secretions • wastes • cell structures

Specific Target Organ: Single Exposure
Specific Target Organ: Repeated Exposure



Acute and chronic exposure hazards. Which is worse, one blow from a 10 000 g (10 kg) hammer or 10 000 blows from a 1 g hammer?

Delayed and Immediate Effects, and Chronic Effects from Short-and Long-term Exposure

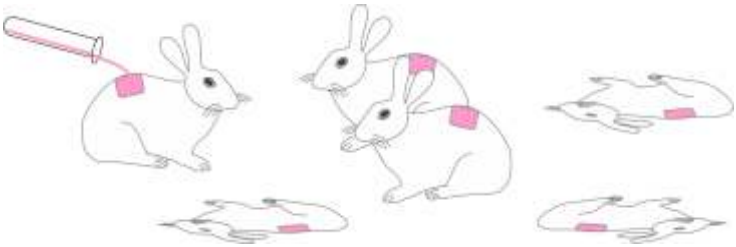
The latency period, the time between the start of exposure and onset of some effects, often is very long. Ten to twenty years is not uncommon. Hence, concern about effects from exposure to chemicals at levels low enough not to produce rapid indicators of problems is natural.

A person chronically exposed could receive a total long-term dose far in excess of the amount needed to cause death during an acute exposure. Alcohol is a prime example of this. A large bottle of spirits or whisky consumed during a short time can and does kill. Yet, the same bottle consumed gradually by the same person during a period of several weeks would produce no obvious effect. Caffeine is another example. The caffeine equivalent of 250 cups of coffee taken in a short time in pill form has killed people. Yet, 250 cups of coffee consumed over a normal time-frame produces no deleterious effect.

Numerical Measure of Toxicity
LD_{50} Oral

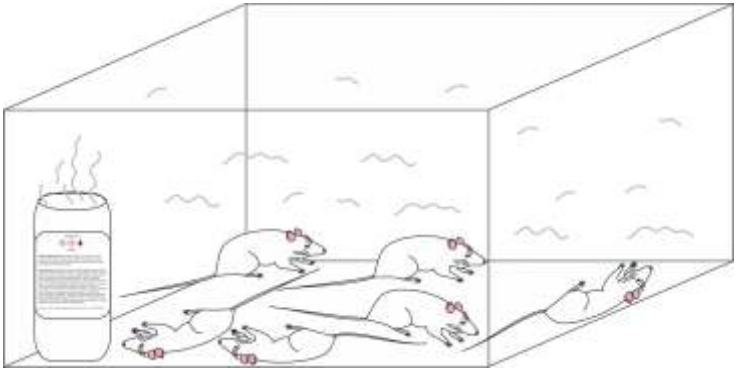
LD_{50} oral is the amount of substance needed to kill 50% of a group of animals during a test lasting 24 hours.

Numerical Measure of Toxicity
LD_{50} Dermal



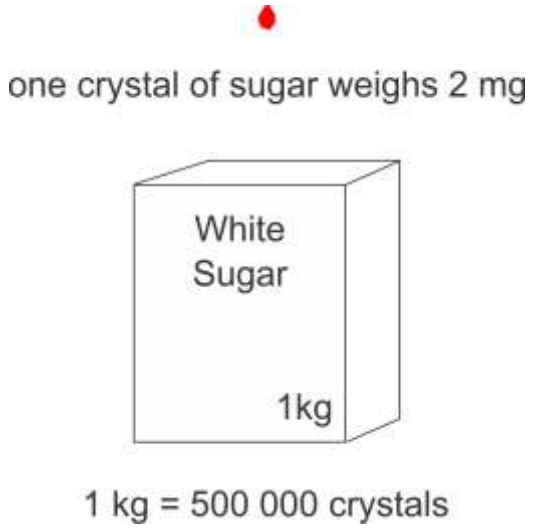
LD_{50} dermal is the amount of substance entering the body through the skin needed to kill 50% of a group of animals.

Numerical Measure of Toxicity
LC_{50}



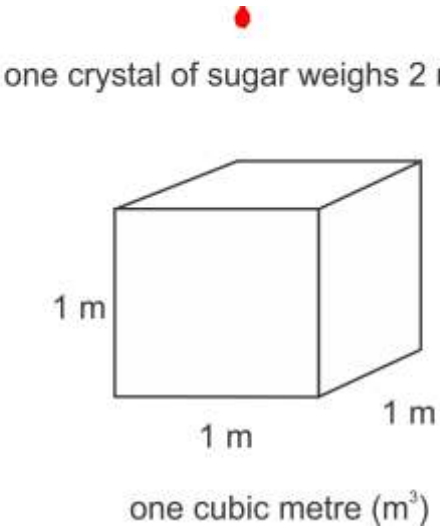
LC_{50} is the concentration of a chemical in air needed to kill 50% or half, of a group of animals.

Whole Body Dose
mg/kg



Grind a crystal of coloured sugar into a fine powder. Then spread the powder evenly throughout a 1 kg box of sugar. This is the same as a whole body dose of 2 mg/kg.

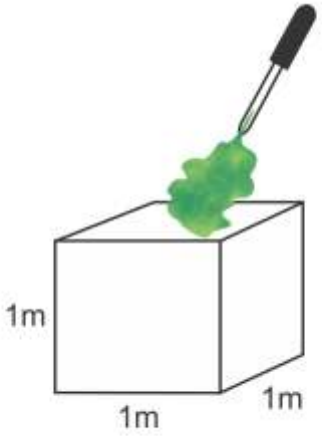
Toxicity Measurement in mg/m^3 (milligrams per cubic metre of air)



Prior to the creation of the GHS, toxicity measurements were provided in mg/m^3. For many users, this may still be the preferred case. The GHS uses mg/l (milligram per litre). To convert mg/l to mg/m^3, multiply the figure for mg/l by 1000. A cubic metre measures 1 m on each side. This is about the same as the volume of a bale of peat moss.

The diagram above shows the effect of grinding a crystal of sugar into a fine powder, then distributing the powder evenly throughout a box containing 1 m^3 of air to produce a concentration of 2 mg/m^3.

Parts Per Million (ppm)



one cubic meter (m^3)

Emptying an eyedropper of chlorine gas (2 mL) into a box containing 1 m^3 air (1 000 000 mL) produces a concentration of 2 ppm.

QUESTIONS AND ANSWERS

1. The information included in this section is frightening. We are learning that chemicals we have used for years could cause disease or kill. What do you feel about this?

There is no denying nor glossing over this fact. However, certain other facts need to be considered. Most, if not all hazardous chemical products can be handled in a safe manner. The proof of this is workplace experience. While this is not perfect for everyone, relatively few persons are affected adversely. The main cause of compensation claims is traumatic injury. Traumatic injuries include falls, trips, cuts and abrasions, amputations, back injuries, and so on. By far the largest single cause of occupational illness is skin disorders. These account for almost half the claims.

2. We are learning about the dangers of chemicals that we have used for years and are considering to refuse to work. What do you say about this?

Refusal to work is a worker's legal right. This decision rests solely with the person. Management and the workforce work in the same environment and are ultimately exposed to the same hazards. Management must be convinced that they have done the right thing in the area of use. This means not exposing anyone including themselves to undue risk. For many

hazards, conditions can be evaluated by relatively simple measurement. Today's workplaces are a dramatic improvement over conditions existing even a few years ago. Hazards are controlled to some extent in most areas of use. Operating experience is an extremely important factor in completing this picture. Plants whose retirees live in good health to ages at least the industrial average can point out this fact. This reality counteracts the abstract fear created by information about potential hazards as presented in the SDS. Another way of looking at this question is the general experience found in a particular industry or trade group. This information is readily obtainable from occupational health and safety libraries, from trade associations, and from workers' compensation boards.

Statistics have shown that the home environment is more hazardous than the workplace environment. More accidents occur at home than at work. The average household also contains many chemical products. A cursory review of the labels demonstrates that many consumer products contain the same substances as found at work. One difference is that the label on a consumer product prior to the GHS did not provide the complete list of ingredients. This was not available to the consumer. The GHS extends to consumer products. As the GHS is adopted by industry, consumer products labelling will reflect its concepts.

3. Which is the most important route of entry?

Inhalation (breathing) is the most important route of entry. The reason is the ease with which substances can enter the body by passing through the lungs.