What is a Material Safety Data Sheet (MSDS)?

The United States Occupational Safety and Health Administration (OSHA) requires all manufacturers to issue Material Safety Data Sheets (also known as MSDS's) with the first shipment of any hazardous chemical product. The purpose of the MSDS is to relay important information about the nature of the chemical -- such as its flammability, toxicity, the need for protective equipment, and spill or clean-up requirements -- to ensure the safety of any potential user of that chemical.

At first glance, the MSDS can seem like an intimidating piece of information. But the information is not that difficult to understand when broken into its component parts. And it is a very important document to read and follow.

- Read the MSDS carefully
- Discuss the cautions specified on the MSDS with your students and instructor
- Utilize necessary protective equipment
- Dispose of the reagent properly in properly labeled Hazardous Waste containers.

What to look for in an MSDS

Where do I find an overall summary of the product and emergency phone numbers?
The chemical product and company identification section provides an overall product summary, including manufacturer address, MSDS date, emergency phone numbers, and a brief description of any hazard.

What is it made of?
The composition and ingredients section spells out the following information about each component of the product:

PCT Percent by weight of this component
CAS Number Chemical Abstract Services or CAS registry number
SARA Superfund and Reauthorization Act -- better known as the "Community Right to Know Law." If an MSDS indicates that a component is listed in SARA 313 and more than the specified amount is used, it must be reported to the USEPA every year.
TLV Threshold Limit Value (TLV) is the maximum airborne concentration allowable for an 8-hour exposure, as recommended by the American Conference of Governmental Industrial Hygienists (ACGIH).
PEL Permissible Exposure Limit (PEL) is the maximum airborne concentration allowable for an 8-hour exposure, as regulated by the Occupational Safety and Health Administration (OSHA).
HAZARD Any physical or health hazards posed by this chemical are explained here.

What are the hazards of using this product?
The hazards identification summary starts out with an emergency overview, plus ratings of the product from the Hazardous Materials Information System and the National Fire Protection Association (NFPA). This section also outlines the potential harmful effects of this product.

How do I administer first aid in the event of an exposure?
The First Aid section spells out the medical attention required in the event of an exposure. Be sure to read this section carefully!

What do I do in the event of a fire?
The fire fighting measures section lists all of the flammability concerns, what media to use to extinguish a fire, and what safety precautions to take, should you be put in a position to fight a fire.

What happens if it spills?
The accidental release measures section spells out the personnel who are qualified to respond to an emergency involving hazardous substances and outlines containment techniques, clean-up techniques, and any necessary evacuation procedures.

What are the handling and storage requirements?
The handling/storage section provides general guidelines for safe handling of the product and lists all storage requirements.

What protective measures do I need to take in the work environment?
The exposure controls/protective equipment section outlines safe laboratory practice (e.g. eyewash station nearby) and any necessary protective gear, such as eye, skin, and inhalation protection.

What does it look/act like?
The physical/chemical properties section spells out information such as the physical state, color, odor, solubility, boiling point, melting point, specific gravity, pH, vapor density, evaporation rate, corrosivity, stability, and storage precautions.

How stable is this product and what storage precautions need to be taken?
The stability/reactivity section spells out storage conditions, including moisture and temperature requirements and compatibility with substances stored nearby.

How did this product perform in clinical trials?
The toxicological information section summarizes data gathered from research with animals, including lethal dosages and concentrations, effects on reproduction, skin toxicity data, and mutation data.

What is the ecological impact of this product?
The ecological information section assesses the material's environmental impact on aquatic and terrestrial plants and animals and the potential of the material to persist in the environment.

How do I safely (and legally) dispose of this product?
The disposal considerations section outlines any dilution guidelines, container information, and national environmental regulations that may or may not be reinforced by regional or local entities.

What are the shipping requirements?
The transportation information section spells out proper shipping name, hazard class, ID number, and packing group for all chemicals regulated by D.O.T., I.C.A.O., and I.M.O.

How is this product regulated?
The regulatory information section outlines all known regulatory guidelines spelled out by OSHA, SARA Title III, the Clean Water Act, RCRA, and any known state regulations.

What is the intended use of this product and how was this MSDS compiled?
The other information section states the product's intended use and lists all reference materials used to write the MSDS.

PICTOGRAMS AND HAZARD CODES

B Biohazard

C Corrosive

E Explosive

F Highly Flammable
F+ Extremely Flammable

Xn Harmful
Xi Irritant

N Dangerous for the environment

O Oxidizing

R Radioactive

T Toxic
T+ Very Toxic