Global Harmonization: A Critical Role For Science Teachers!

I. What Is The Globally Harmonized System Or GHS?

GHS is an international system of chemical classification and labeling. GHS stands for the "Globally Harmonized System of Classification and Labeling of Chemicals. It is designed to communicate health and safety information on labels. This information is also available on Safety Data Sheets (SDS), similar to currently existing Material Safety Data Sheets (MSDS) in the USA. The purpose and hope of this system is global harmonization or everyone adopting and using it around the world. Everyone would be playing by the same set of rules for chemical classification and labeling.

II. Why Is There A Need For GHS?

According to the UNECE or United Nations Economic Commission for Europe report on GHS (2007 second edition – Globally Harmonized System of Classification and Labeling of Chemicals or GHS - Section 1.1.1.1) “The use of chemical products to enhance and improve life is a widespread practice worldwide. But alongside the benefits of these products, there is also the potential for adverse effects to people or the environment.” In Section 1.1.1.2, the report goes on to say, “While these existing laws or regulations are similar in many respects, their differences are significant enough to result in different labels or SDS for the same product in different countries. Through variations in definitions of hazards, a chemical may be considered flammable in one country, but not another.” This is the very heart of the issue – lack of consistency when it comes to dealing with hazardous chemicals. In some countries, there are no existing regulations applied to the handling or use of hazardous chemicals!

Section 1.1.1.4 lists the reasons for setting the objective of harmonization. It is hoped that implementation of the GHS will:

a. enhance the protection of human health and the environment by providing an internationally comprehensible system for hazard communication;
b. provide a recognized framework for those countries without an existing system;
c. reduce the need for testing and evaluation of chemicals; and

d. facilitate international trade in chemicals whose hazards have been properly assessed and identified on an international basis.”

III. What Are The Major Components In GHS?

The two major components of the GHS are classification and communication of information about hazardous chemicals. The system establishes criteria to better classify pure chemicals and mixtures.

The GHS plan communicates hazards and precautionary information with the use of prescribed labels and Safety Data Sheets (SDS). Labels must have specific information using the chemical’s identity, hazard statements and signal words/symbols. Pictograms or GHS symbols are used on labels and SDS. Precautionary statements are also required. Signal words used in GHS include “Danger” and “Warning.” This tells the user the level of the hazard on labels and SDS. The more serious or Category 1 is “Danger,” with Category 2 being “Warning.” Standardized “Hazard Statements” are used to describe each category of hazard. “Class” is a term used to characterize different hazards such as “Gases under Pressure.” “Categories” are sub-sections of classes.

The Safety Data Sheets provided specific hazard information so individuals will know how to deal with hazardous chemicals. The GHS defines 16 standardized sections and a prescribed order.

IV. What Is The GHS Framework Concept?
The GHS has a hazard groupings and building block framework. There are three major hazard groups including: Environmental hazards, health hazards and physical hazards. Within each hazard group are classes and categories. These make up the “building blocks.” Countries have the option of determining which building blocks they will use in their sectors such as the workplace, consumer realm, etc. Having the building blocks in place, the appropriate GHS rules are applied for classification and labels.

As one example, the Health Hazard grouping criteria are addressed for the following health hazard classes:

- acute toxicity
- skin irritation/corrosion
- serious eye damage/eye irritation
- respiratory or skin sensitization
- mutations in germ cells
- cancer
- reproductive toxicity
- target organ systemic toxicity - single exposure
- target organ systemic toxicity - repeated exposure
- aspiration hazard and
- chemical mixtures

V. SDS – What Can We Expect?

The SDS content according to Section 1.5.3.3.1 should provide a clear description of the data used to identify the hazards. The information in the SDS according to Section 1.5.3.2.1 should be presented using the following 16 headings in the prescribed order given below:

1. Identification
2. Hazard(s) identification
3. Composition/information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information.

This represents a defined and orderly content compared to existing MSDS and other chemical information listing formats.

VI. Happening of Harmonization!

The United Nations accepted an international mandate to develop the Globally Harmonized System or GHS for hazard classification and labeling. This was adopted at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, also known as the Earth Summit. GHS has been developed with the help of participants from various governments such as Australia, Canada, China, Japan, UK, and USA. Also, international organizations such as the International Labor Organization and others are on board in the development of GHS.
The United Nations Economic Commission for Europe or the UNECE estimates that there are close to 100 countries working toward implementation, each in various stages of examining and planning implementation of the GHS. The GHS is voluntary! Some countries and agencies are more than likely to maintain their own regulations and adopt parts of the GHS to help enhance their systems/regulations. Although the original target date for implementation of GHS was by the year 2000, several refinements and issues have moved it to 2008 with specific countries choosing their own timelines.

VII. Science Educators Training the Future!

Section 1.4.9 focuses on training required for successful use of the GHS. “Key target audiences for training include workers, emergency responders, and those involved in the preparation of labels, SDS and hazard communication strategies as part of risk management systems. Others involved in the transport and supply of hazardous chemicals also require training to varying degrees. In addition, systems should consider strategies required for educating consumers in interpreting label information on products that they use.”

Science teachers will have a key role in helping future citizenry learn, understand and apply the GHS system as employees, consumers and transporters in dealing with hazardous chemicals. Classroom and laboratory work, as well as science textbooks, will help foster the GHS to help students be safer in their world. If this safety initiative is to succeed, the success will in part, depend of science teachers working with the “future” inside their laboratories and classrooms. Learn more about the GHS for you and the future you touch by referring to the resources listed below.

Resources:

GHS Criteria for different hazard classes: http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html


Occupation Safety & Health Administration: http://www.osha.gov/dsg/hazcom/ghs.html


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