Laboratory Safety Course

In partnership with

Day One

Registration
Introduction (A)
Three Cs of Safety (A)
Scope of the Problem (U)

BREAK

Activity I – Accidents (B)
Legal Aspects of Safety (N)

LUNCH BREAK
OSHA Laboratory Standard (P)
Fire Control (i)

BREAK

Labeling
Biological and Animal Hazards

BREAK

Eye and Face Protection (H)
Activity (II): Planning for Emergencies (Q)
Discussion

Day Two

Review/Introduction
Handling Chemical Reagents (J)
Ventilation (W)

BREAK

Storage of Chemicals (D)
Activity (III) – The Most Serious Problem (B)
Electrical Safety (G)

LUNCH BREAK

Disposal of Chemicals (F)
Safety Equipment Display (B)
Needs Assessment (O)

BREAK

Employee/Student Involvement (V)
Activity (IV) - Safety Program Planning (T)
Movie: “Safety - Isn’t It Worth It?”
Course Critique and Discussion
Introduction
Let's get to know LSI and the critical components in an effective lab safety program: New Employee Orientation, Manual, Safety Committee, and Rules Agreement.

Three C’s of Safety
Safety is really just a matter of choices. But, you are not free to choose unless you know the choices. And, equally importantly, you don’t make the best choices unless you understand the consequences. This course teaches about the choices and the consequences in a way that makes them both fun and memorable.

Scope of the Problem
Life is filled with hazards. Labs have them too, but that's just part of life. Tens of thousands of people die and millions are injured each year. Billions of dollars are wasted. And yet, the solution is clear, simple, and obvious. By taking the time to make health and safety an integral and important part of science education, work, and life, we can live safer, healthier, longer lives.

Accidents
I've been collecting anecdotal accounts of lab accidents for 25 years. In this section we share some stories. They are powerful examples, make lasting impressions, and serve as a graphic reminder. The stories have been published in our series, Learning By Accidents Volume 1 & 2. Please send us your account of the most serious lab accident you recall.

Legal Aspects
One of the unfortunate outcomes of accidents is a lawsuit. Liability and negligence issues can’t be ignored in today’s lab operations. In this section we explain the types of negligence, the responsibilities of supervisors and employees, and how to reduce the likelihood of lawsuits.

OSHA Lab Standard
OSHA requires most labs to have a chemical hygiene officer (CHO) and a written chemical hygiene plan (CHP). The twelve sections of the standard are explained with examples drawn from successful programs. You’ll have a much better idea of how to be an effective CHO and what belongs in a good CHP.

Fire Control
Can you explain the difference between flash point and autoignition temperature, between detonation and deflagration, between fire triangle and fire tetrahedron? How many gallons of flammable liquid should you have in your lab? Which fire extinguisher is right for which kind of fire and what’s the easy way to remember? Where are the hidden sources of ignition?
Labeling
What is the essential information that belongs on a label? I cover some labeling systems and describe the kinds of problems that result from poor labeling practices.

Biological and Animal Hazards
Infection is the biggest problem. Five percent of lab infections result in death. Appropriate precautions are discussed along with other bio lab hazards including fieldwork.

Handling Glassware
There are three types of glass. Each has its own special lab uses. Cleaning methods, insertion techniques, hot glass, storage, pressure and vacuum are discussed.

Eye and Face Protection
The ANSI standard sets the stage for a discussion of glasses, goggles, and face shields. When should each be used? Why are ANSI approved safety glasses four ways better than street glasses? Contact lens use, portable shields, and eyewash fountains with the related problem of a blindness causing amoebae are covered in this section. Who was Bob Aspromonte?

Planning for Emergencies
What are the twelve most common types of lab emergencies? What immediate action should be taken? How should you prepare to deal with those emergencies? Sadly, less than five percent of the more than 35,000 scientists and science educators I’ve spoken to have been discussing these emergency situations with their colleagues or written plan to deal with them.

Handling Chemicals
There are four properties of chemicals, which make them dangerous. I review those properties and draw the connection to similar chemicals in our homes. What about the experimentation? What are the prudent practices, protective equipment and protective facilities needed to minimize the risk?

Ventilation
I discuss the types of ventilation in a building and the public health recommendations for fresh air. Then, I shift to laboratories and fume hoods, their use and misuse. There are several types of chemical fume hoods. The various types and their operation are reviewed.

Electrical Safety
Here is an area of lab safety that most lab workers don’t understand. Ninety-nine percent of the people I speak to were never taught the correct way to plug in a two
Your Worst Problem
Now you are going to sit in on the discussion by the seminar participants of their most serious lab safety problem. I’m sure many of them might well be yours as well.

Storage of Chemicals
Six critical areas are discussed: Access, Space, Fire Control, Ventilation, Shelf Security and Arrangement. I think keeping the door locked is the most important. And, I suggest some simple ways to have less crowded storage.

Disposal of Chemicals
In this section, I present the concept and practice of a chemical management system. It begins with assuming responsibility. Then, I discuss determining hazard, inventory, purchasing philosophy, avoiding waste formation, obeying the law, and selecting a vendor. This section concludes with teaching the home application.

Safety Equipment Display
I’ve always taken a suitcase full of safety equipment with me to seminar and short courses. At the seminar, we play a game, “Can you identify these”. At the short courses, I discuss the application and use of some of the pieces in the collection.

Needs Assessment
Who’s responsible for safety? How do we conduct facilities inspections? The short course notebook contains several checklists including a five-page lab inspection guide. In addition, now there’s a model lab to inspect with over 50 errors to be spotted.

Employee or Student Involvement
How do you get others involved in the safety program? In this section, I’ll discuss some of the principles and a wide variety of ways to do it. At the beginning of the course, Ed Ochoa from El Paso asked how to convince others that safety is important. More than 25 ways were suggested throughout the short course and in this section.

A Condition of Employment or Acceptable Behavior
This short section is one the most important in the whole course. Here, I provide some solid reasons why working safely must be a condition of the classroom. That’s right students need to be discharged from your classroom that don’t follow the safety rules.

Safety Program Planning
It takes a lot of things to have an effective safety program. Join the course participants in a group discussion to improve their lab safety program. Then, I present my five top characteristics for an effective program. You’ll learn about the
Instructor Bio

Dr. James Kaufman is President/CEO of The Laboratory Safety Institute (LSI) and former Professor of Chemistry and EHS Director at Curry College. He received his bachelor’s degree in chemistry from Tufts University and his doctorate in organic chemistry from Worcester Polytechnic Institute (WPI).

After two years as a post-doctoral fellow in the WPI Chemical Engineering Department converting garbage into fuel oil, Dr. Kaufman joined the Dow Chemical Company's New England Research Laboratory as a Process Research Chemist. During his four years with Dow, he became increasingly involved in laboratory safety related activities. He authored "Laboratory Safety Guidelines". Originally distributed by Dow, now over four million copies (in twelve languages) of the widely requested and reprinted brochure are in circulation.

Dr. Kaufman is the founder and President/CEO of The Laboratory Safety Institute – an international, non-profit center for safety in science and science education. LSI's lectures and training programs, AV-lending library, Mini-Grants, Internet discussion list, and publications help both academic and non-academic institutions throughout the world. Over 100,000 scientists and science educators have attended these courses and presentations. LSI is supported, in part, by grants from individuals, foundations, companies and professional societies.

LSI conducts seminars, short courses, webinars, audits and inspections for schools, colleges, and companies. They also provide advice on regulatory compliance, safety program development, facilities design, editorial commentary on laboratory texts, and expert witness testimony.

Dr. Kaufman is a former, ten-year member of the American Chemical Society's (ACS) Council Committee on Chemical Safety and is past-chairman of the 2,500-member ACS Division of Chemical Health and Safety. He is the author-narrator of the ACS Audio Course on Laboratory Safety and editor of "Waste Disposal at Academic Institutions" from Lewis Publishers. He recorded and edited the "One-Day Laboratory Safety Audio Seminar" and "Two-Day Lab Safety Video Course." He is a co-authored of "Safety Is Elementary: the new standard for safety in the elementary science classroom"

Dr. Kaufman is chair of the Safety In Science Education Committee of the International Council of Associations for Science Education (ICASE). Most recently, he was appointed to the Science Safety Advisory Committee of the National Science Teachers Association (NSTA).