THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Knowledge that will change your world

# Teaching Safety: Two Hands at a Time

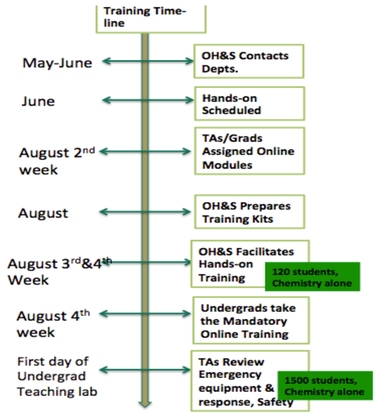
## A Tiered Approach to Laboratory Safety and Emergency Response Training: Providing Hands-on, Cost Effective Training to a Large Group of Students

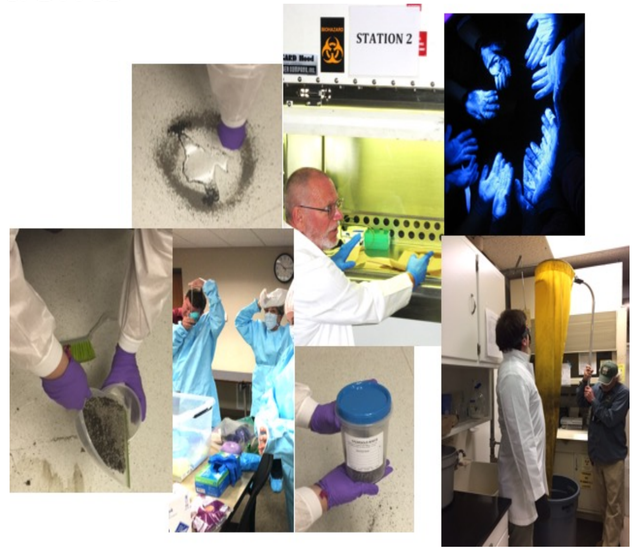
### Tiered Approach to Training:

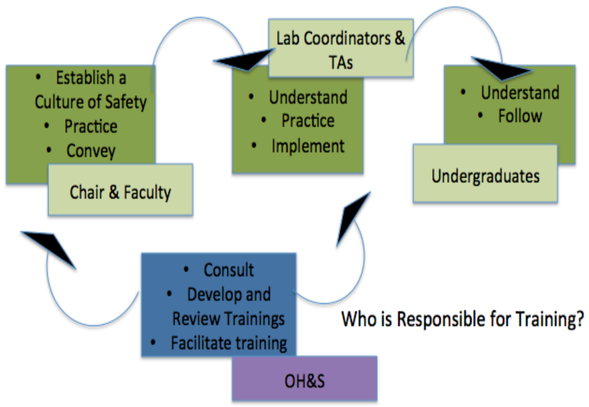
- Cost effective
- Easy to implement across the educational spectrum
- Links theory and practice through a hands-on component in emergency response
- Is practical enough to train thousands of students during a year.

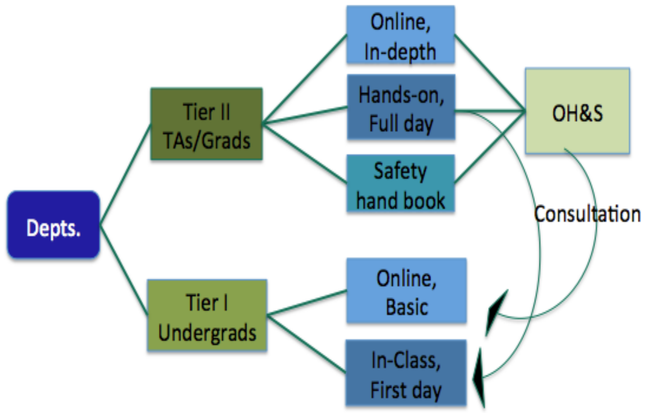
### How does the training work?

- TAs/ Grad students assigned and notified about an online safety training based on the R.A.M.P concept (pre-requisite for hands-on)
- EH&S schedules hands-on training with the departments at the beginning of the Fall semester (Time Line)
- EH&S facilitates the hands-on session at different departments, generally in teaching labs to get TAs familiarized with the emergency equipment (sample agenda)
- Undergrads assigned to an online training module (pre-requisite for lab work) involving modules, videos and a quiz
- TAs start labs with safety talk identifying emergency equipment (location, use, and how to respond to emergencies)




**The tiered approach (two tiers) divides undergraduate students into a basic tier (Tier I) of training and graduate students and teaching assistants (TAs) into an advanced tier (Tier II)**

### Tier-I
### Undergraduate Students

1. A mandatory online course: Safety videos, a short course and a quiz before the first lab session
2. Every lab session will begin with a brief experiment specific safety talk by the TAs and familiarization with the location and use of safety equipment.

### Tier-II
### TAs/Graduate Students

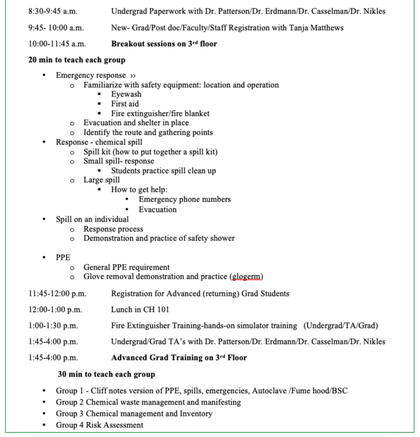
Enrolled into a two-part training:

1. An online course based on the R.A.M.P (**R**ecognize the Hazards, **A**ssess the Risk, **M**anage the hazards and **P**repare for Emergencies) framework of risk management. The course consists of four standard modules, plus an additional department specific safety module
2. A daylong hands-on safety workshop where students will practice on:
   - Operating safety shower/eyewash
   - Using fire extinguishers
   - Cleaning up spills
   - Conducting risk assessment and choosing appropriate PPE
   - Emergency response/evacuation and shelter in place

### Cost of Implementation for STEM Students

EH&S provided hands-on training to 376 TAs/Grads (Tier II) in the Chemistry, Biology, Physics and Engineering Departments during the fall semester. These students then trained approximately 3200 undergrads (Tier I). The cost of training/student was $1.42 for Tier II and ~$0.17 for Tier I.

| Supply Cost for Fall 2019 Safety Training | | | |
|---|---|---|---|
| | Quantity | Unit Cost | Total Cost |
| Spill Kit Refill | 10 | $ 3.25 | $ 32.50 |
| Emergency Shower Test Kit | 1 | $ 125.00 | $ 125.00 |
| Gloves | 8 | $ 30.00 | $ 240.00 |
| Timers | 10 | $ 10.00 | $ 100.00 |
| Glo Germ | 2 | $ 10.00 | $ 20.00 |
| UV Flashlight | 2 | $ 8.00 | $ 16.00 |
| | | Total | $ 533.50 |
| Cost per TA/Grad trained | 376 | | $ 1.42 |
| Cost per undergraduate trained | ~ 3200 | | $ 0.17 |



**CHEMISTRY ANNUAL SAFETY TRAINING**

**AUGUST 23, 2019**

**8:15 a.m. - 5:00 p.m.**

8:15 -8:30 a.m. Undergrad Registration with Tanja Matthews

8:30-9:45 a.m. Undergrad Paperwork with Dr. Patterson/Dr. Erdmann/Dr. Casselman/Dr. Nikles

9:45- 10:00 a.m. New- Grad/Post doc/Faculty/Staff Registration with Tanja Matthews

10:00-11:45 a.m. **Breakout sessions on 3rd floor**

**20 min to teach each group**

- Emergency response ››
  - Familiarize with safety equipment: location and operation
    - Eyewash
    - First aid
    - Fire extinguisher/fire blanket
  - Evacuation and shelter in place
  - Identify the route and gathering points
- Response - chemical spill
  - Spill kit (how to put together a spill kit)
  - Small spill- response
    - Students practice spill clean up
  - Large spill
    - How to get help:
      - Emergency phone numbers
      - Evacuation
- Spill on an individual
  - Response process
  - Demonstration and practice of safety shower
- PPE
  - General PPE requirement
  - Glove removal demonstration and practice (glogerm)

11:45-12:00 p.m. Registration for Advanced (returning) Grad Students

12:00-1:00 p.m. Lunch in CH 101

1:00-1:30 p.m. Fire Extinguisher Training-hands-on simulator training (Undergrad/TA/Grad)

1:45-4:00 p.m. Undergrad/Grad TA's with Dr. Patterson/Dr. Erdmann/Dr. Casselman/Dr. Nikles

1:45-4:00 p.m. **Advanced Grad Training on 3rd Floor**

**30 min to teach each group**

- Group 1 - Cliff notes version of PPE, spills, emergencies, Autoclave /Fume hood/BSC
- Group 2 Chemical waste management and manifesting
- Group 3 Chemical management and Inventory
- Group 4 Risk Assessment

### Applicability at other institutions

- Any institution could easily implement this training method to provide effective hands-on, face-to-face safety training to a large number of students at once in a very cost effective way.
- allows students to not only receive classroom instructions but to also experience practical applications in a controlled environment.
- Learning by doing ensures students will remember their safety training and use those skills in an emergency.

### Future Plans

Utilize Qualtrics to evaluate efficiency, effectiveness and the impact of the training

- Pre, post training surveys and an end of the semester survey to learn about information retention
- Evaluate intra-team participation, team member effectiveness and individual competence

Expand the training

- Lab manager and additional staff
- Minors, undergraduate researchers and visiting scientists