

Working Safely in the Department of Physics and Astronomy

General Considerations

Annual In-Person Safety Training,
Sep 27, 2024
charles.jui@utah.edu

These presentations are broadcast on Zoom and being recorded. The videos and slides will be available by next week at <http://www.physics.utah.edu/safety>

Today's Training

- Any one who is paid by the department
 - this (General Safety) Training
- Laboratory workers should attend all of these:
 - Chemical Safety training
 - Cryogenics training
 - Laser Safety training
- Lab teaching assistants should receive training specified by your instructor from these three
- Learning assistants are not paid by the department but are encouraged to attend
- Please sign completion form to acknowledge only the training sessions you attended and give it to your PI/Supervisor
- PI/Supervisors should collect and keep all signed forms, scan them and send a copy to charles.jui@utah.edu and upload a copy to SAM for your group.
- If you don't know who your supervisor is, keep your form and send a scan to charles.jui@utah.edu

In case of Accidents or Injuries

- Emergency Response
 - Police, fire, etc.: 801-585-2677 (5-COPS on campus)
 - EHS: (801) 581-6590 open 8am-5pm
 - 911 (9-911 from a campus phone)
 - <https://alert.utah.edu/emergency-response-guide/>
- Illness, Injuries, fire, ...etc. accident: 911 (9-911 campus phone)
 - <https://oehs.utah.edu/topics/injuries-or-illnesses>
 - [https://oehs.utah.edu/resource-center/forms/e-1-hr-workers-compensation-first-report-of-injury-form-122.](https://oehs.utah.edu/resource-center/forms/e-1-hr-workers-compensation-first-report-of-injury-form-122)
- Auto accident form (via CIS login)
 - <https://riskmanagement.utah.edu/intranet/vehicles/vehicle-accident.php>

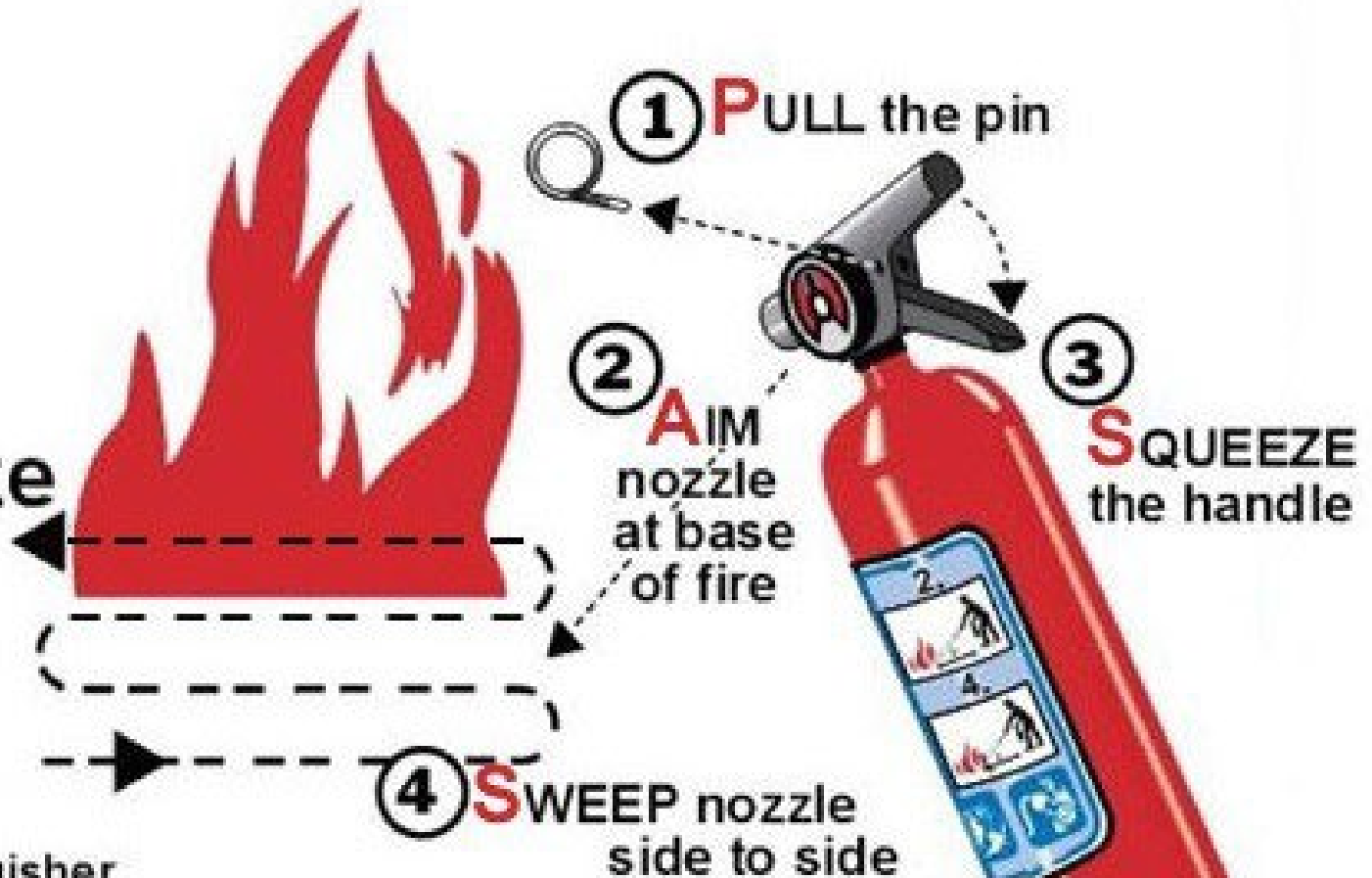
Fire Extinguisher Operation

Pull

Aim

Squeeze

Sweep



Know your extinguisher

Use the correct extinguisher

(Check your own extinguisher's label for detailed instructions.)

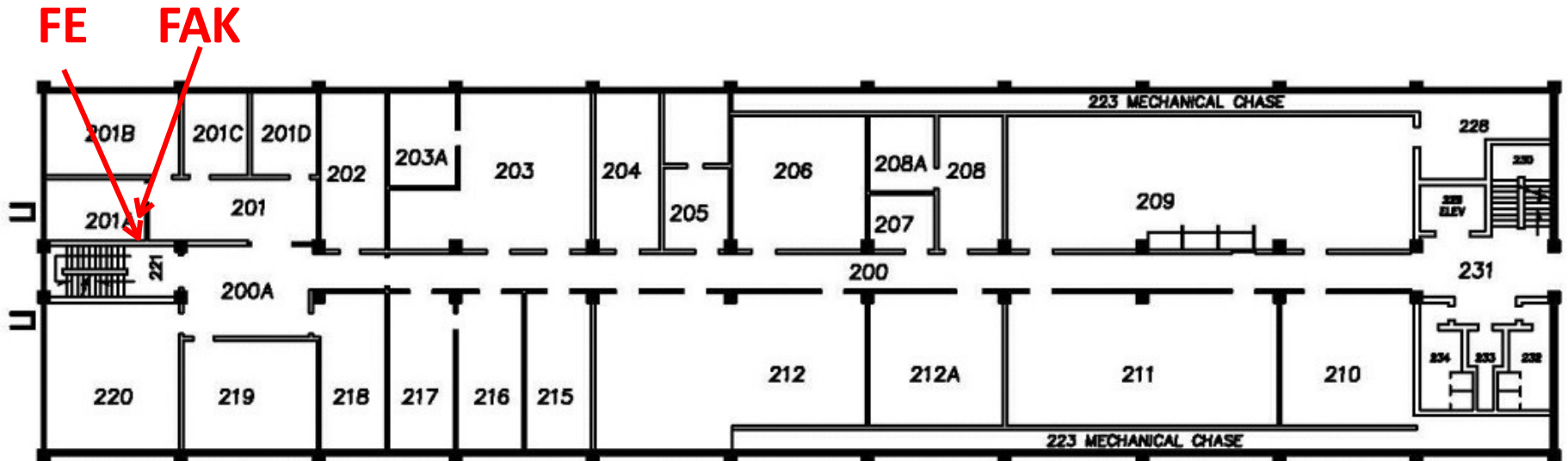
- First aid supplies are available in shops, main office and some labs
 - Must be “self administered”
 - You can’t legally put a Band aid on someone else unless you have taken the “Blood borne pathogen training”
- Know the locations of fire extinguishers, eye-washes and emergency showers
- You may only use a respirator if you have taken the training

AED: Automated External Defibrillator

- Instructions commence on your opening of the device.
- Many explanations available on YouTube
 - <https://www.youtube.com/watch?v=IL3EmNRjlvE>
 - Above video includes check for consciousness and CPR



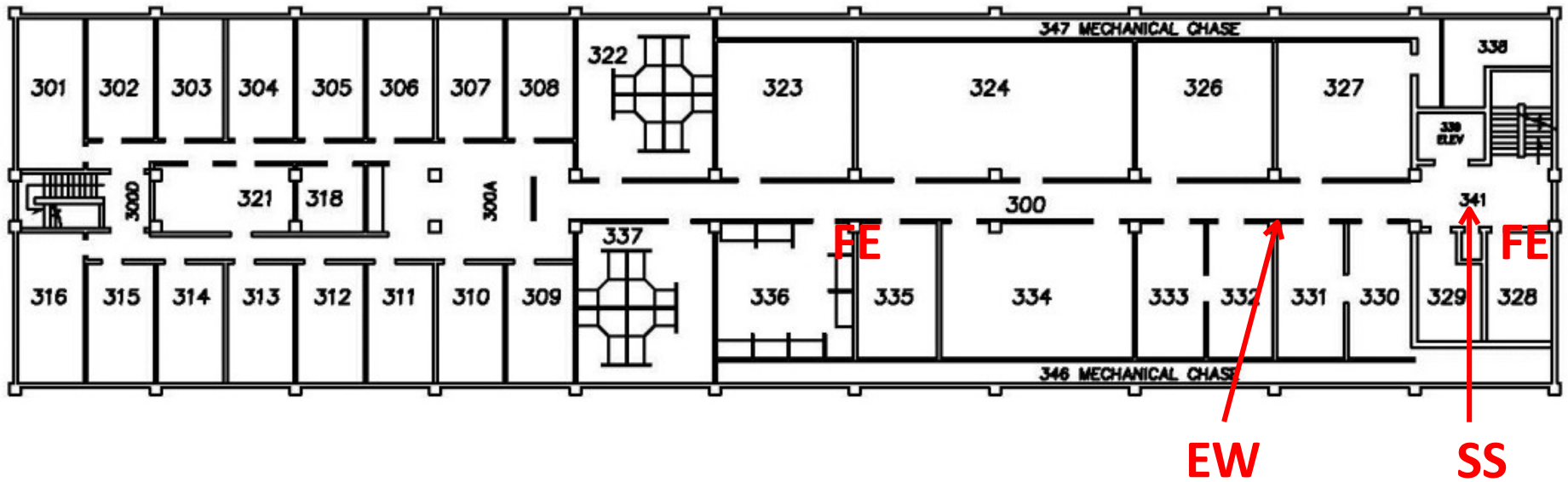
JFB Second Floor



FE = Fire Extinguisher

— FAK = First Aid Kit

JFB Third Floor

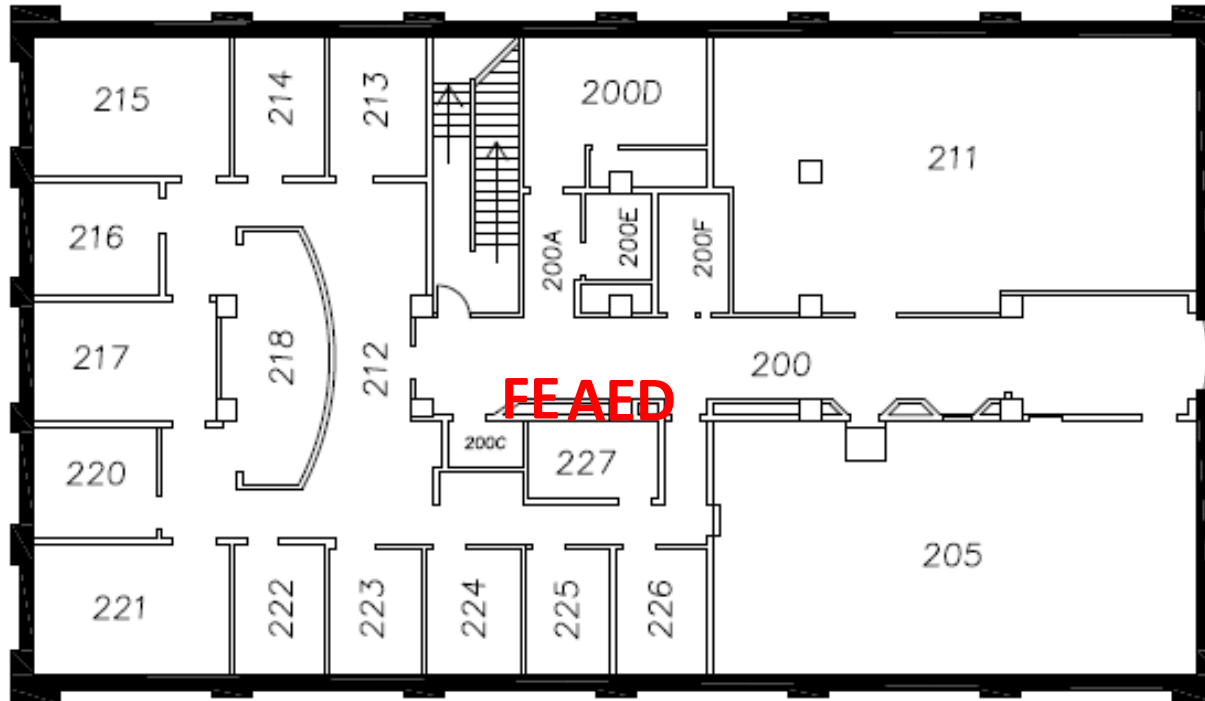


FE = Fire Extinguisher

– SS = Safety Shower

– EW = Eye Wash

SP Second Floor

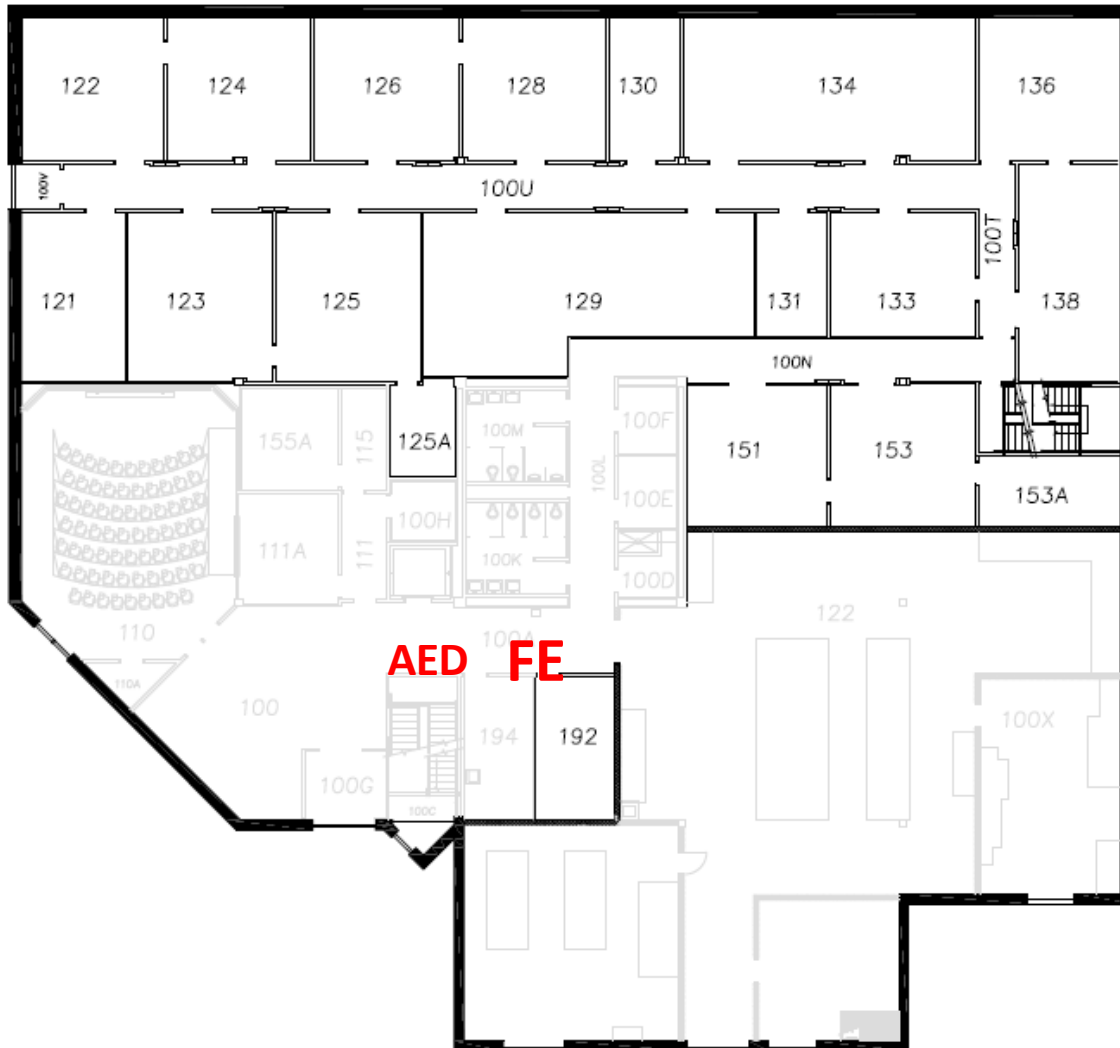


FE = Fire Extinguisher

FE also found outside of SP 402

AED = Automated External Defibrillator

INSCC First Floor



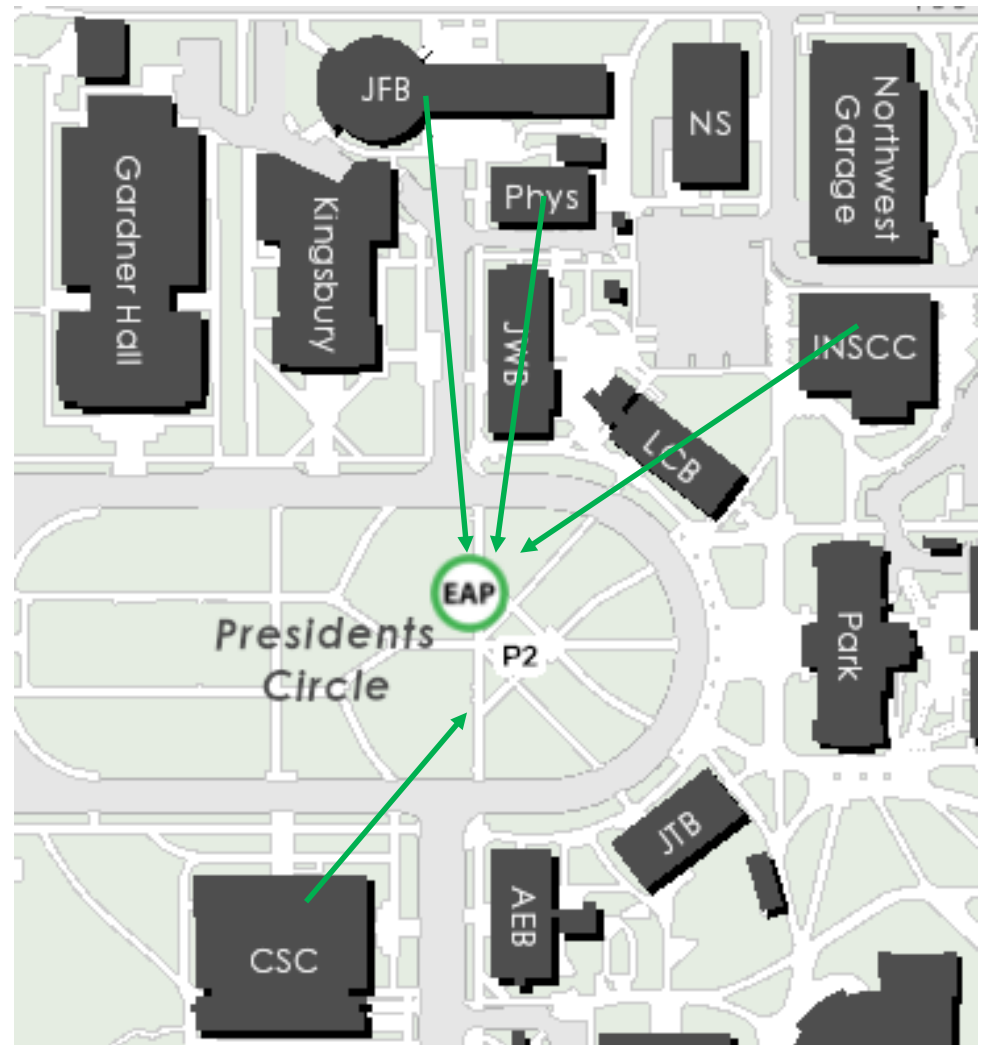
AED = Automated External
Defibrillator

FE = Fire Extinguisher

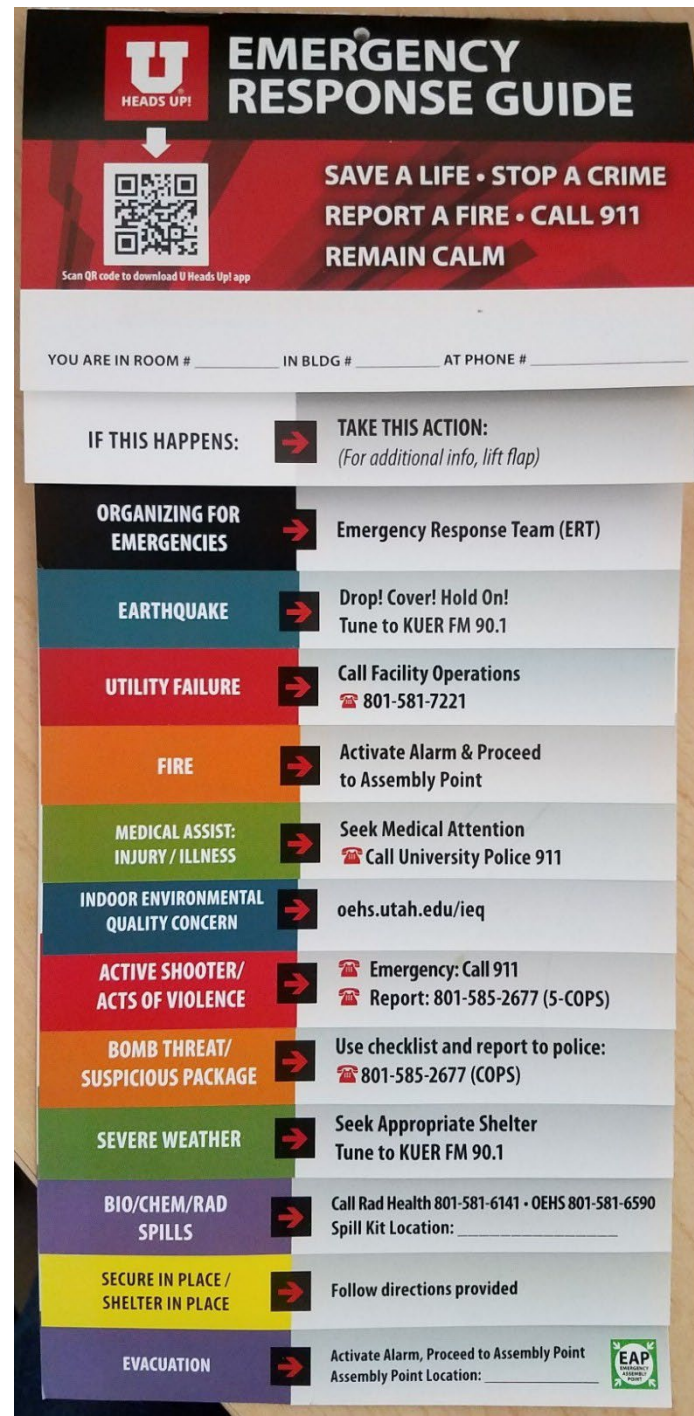
FE also found
outside of INSCC 227
(cosmic ray group)
AND in INSCC 480
(Astronomy group)

Emergency Assembly Point

- When you hear an alarm sound, or receive an emergency alert
 - E.g. fire, chemical spill, earthquake ...etc
- Leave and assemble at the designate EAP and await further instructions there.
- Emergency Alert: Sign up via link in <https://alert.utah.edu/>



Emergency Response Guide – should be in every lab



U HEADS UP! **EMERGENCY RESPONSE GUIDE**

SAVE A LIFE • STOP A CRIME
REPORT A FIRE • CALL 911
REMAIN CALM

Scan QR code to download U Heads Up! app

YOU ARE IN ROOM # _____ IN BLDG # _____ AT PHONE # _____

IF THIS HAPPENS: → **TAKE THIS ACTION:**
(For additional info, lift flap)

ORGANIZING FOR EMERGENCIES	→	Emergency Response Team (ERT)
EARTHQUAKE	→	Drop! Cover! Hold On! Tune to KUER FM 90.1
UTILITY FAILURE	→	Call Facility Operations ☎ 801-581-7221
FIRE	→	Activate Alarm & Proceed to Assembly Point
MEDICAL ASSIST: INJURY / ILLNESS	→	Seek Medical Attention ☎ Call University Police 911
INDOOR ENVIRONMENTAL QUALITY CONCERN	→	oehs.utah.edu/ieq
ACTIVE SHOOTER/ ACTS OF VIOLENCE	→	☎ Emergency: Call 911 ☎ Report: 801-585-2677 (5-COPS)
BOMB THREAT/ SUSPICIOUS PACKAGE	→	Use checklist and report to police: ☎ 801-585-2677 (COPS)
SEVERE WEATHER	→	Seek Appropriate Shelter Tune to KUER FM 90.1
BIO/CHEM/RAD SPILLS	→	Call Rad Health 801-581-6141 - OEHS 801-581-6590 Spill Kit Location: _____
SECURE IN PLACE / SHELTER IN PLACE	→	Follow directions provided
EVACUATION	→	Activate Alarm, Proceed to Assembly Point Assembly Point Location: _____

EAP Emergency Action Plan

Electrical and RF Safety

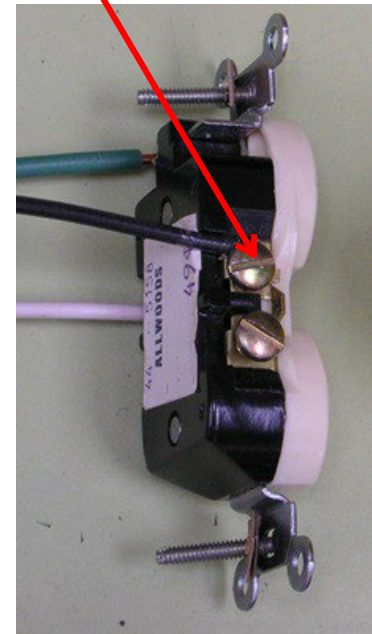
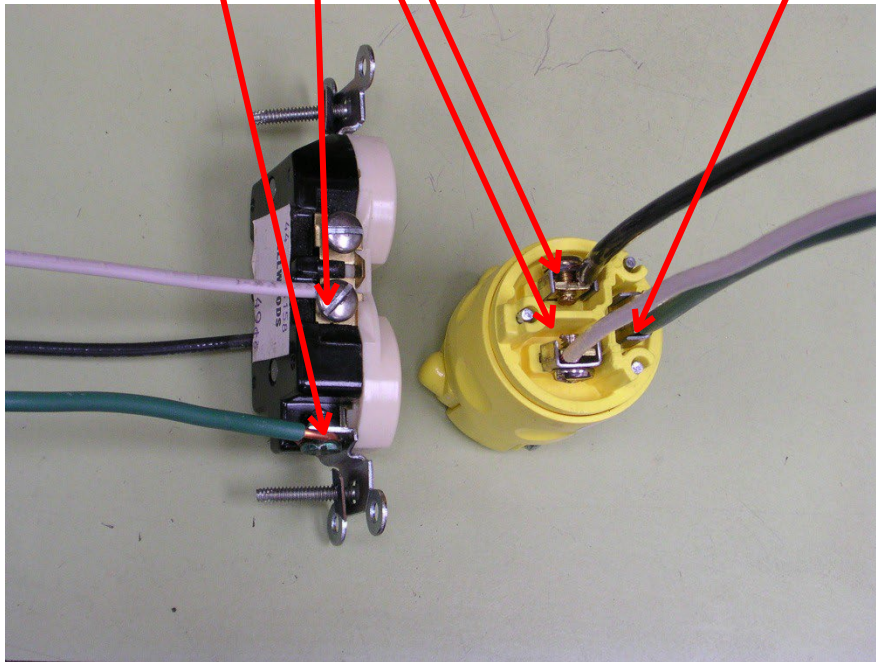
- Electrocutation
 - The current passing through the chest area causes electrocution. Contact is usually made with one arm, the current passing through to the other arm or to a leg. The amount of current passed, not the voltage involved, is critical.
 - It is primarily skin resistance that (combined with the applied voltage) determines the current passed through the body. There have been electrocutions with a 22 volt source when the skin resistance was lowered by abrasion.
 - The most dangerous voltage source is the 110 Vac that powers the labs, shops and offices. Not only is it sufficient in many cases to pass the deadly 100 mA of current, but there are so many opportunities to come in contact with it.

Other Electrical Hazards

- Damage Due to Reflex Action
 - Currents over 10 mA can cause violent involuntary muscle contraction. Such contractions can result in bodily damage and/or equipment damage.
- Burns
 - Currents over about 2 A will result in burns at the point of contact. This is a major factor only for those working with extremely high (many kV) sources.
- Burned Out Electronics
 - Your electrical accident may destroy your electronics. It takes less than 50 volts to cause major damage in some CMOS circuits, so it is clear that 110 Vac is again a major hazard.

Wiring Plugs and Outlets

- Black (hot) wire to brass screw
- White (neutral) wire to silver screw
- Green (ground) wire to green screw



- Electrical equipment requiring a ground must be grounded



- Horseplay (playing tricks on people that could distract them or cause them to react unpredictably) is strictly forbidden

Radio Frequency (RF) Field Injury

- Microwave fields are efficiently absorbed by water-containing materials, such as the human body. This fact is put to use in microwave ovens.
- The threshold is only about one milliwatt/cm² for damage to the eyes.
- This damage is not associated with pain, so one must take care not to work with microwaves that are not enclosed in waveguides if the power densities can exceed this level.

- High voltage
 - Be especially careful on [metal!] ladders and other high places
 - Avoid possible hand-to-hand or hand-to-foot current paths
 - Both pass through your heart
 - Keep one hand in your pocket while the other engages the high voltage.
- Avoid working in labs and shops alone
 - Especially with dangerous chemicals or equipment
 - If you insist on working alone, leave the door unlocked or open so a passerby can see your lifeless body on the floor and summon help.

- High pressure gas cylinders
 - Always use a regulator
 - Always chain up
- Next slide is a scene from Mythbusters showing the effects of breaking off the valve on a high pressure gas cylinder





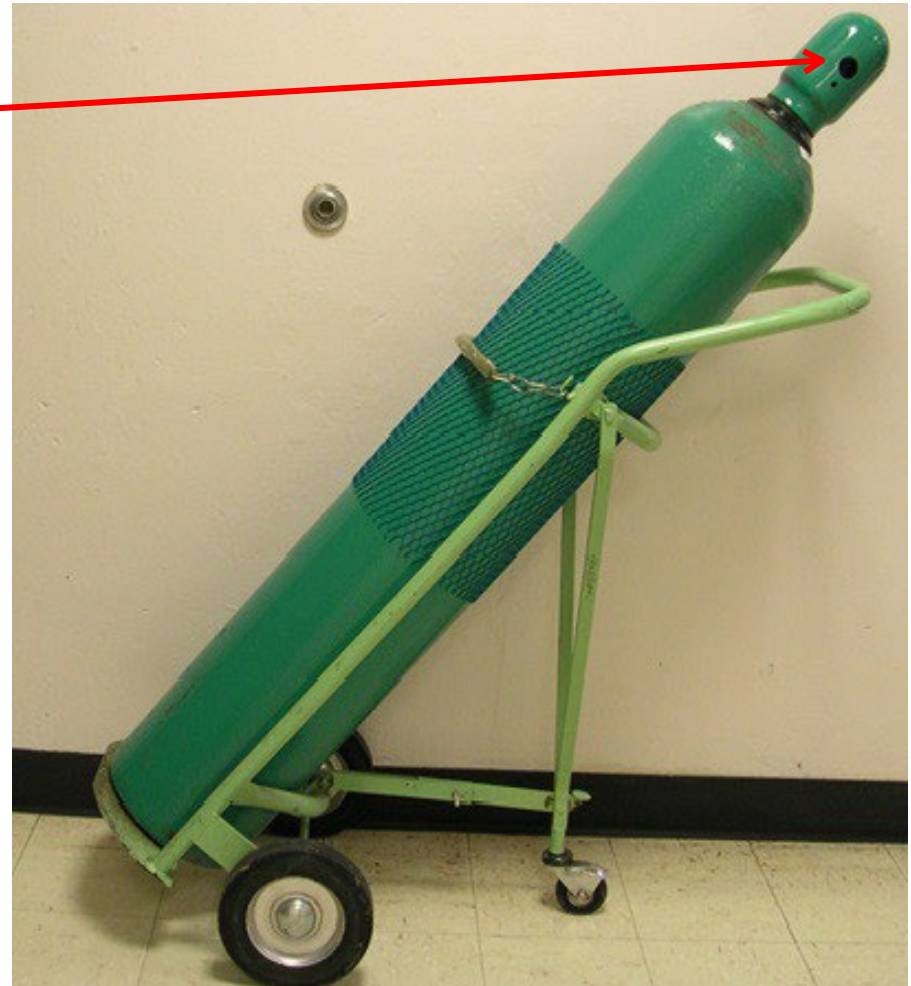
High pressure gas cylinder with valve broken off has passed through one cinder block wall and into a second one.

Adam Beehler has the video.

Fun to watch!



- Gas cylinders, continued
 - Remove regulator and install bonnet (which you would call a “cap”) before moving
 - Always move on a cart



- Remove any grease before installing regulator
 - Grease and oxygen form an explosive mixture

Truly Random Stuff!

- Keep hall doors closed in case of fire or spill
 - Realistically, kick out blocks during evacuation



- Keep halls free of clutter
 - Ladders, tables, packing boxes, LHe dewars, etc.



- Many rooms still have ceiling tiles with asbestos
 - Do not move them without contacting Harold Simpson at (801) 581-3839



More Random Stuff

- No smoking anywhere on campus!
- No eating or drinking in labs with chemicals or radioactive sources
- Belt-driven machinery must have belt guards



- Wear eye protection when soldering, handling chemicals, glassware, cryogenics, mixing cement, AND in the machine shops.



- No bare feet, flip-flops or sandals in labs or shops
- No roller-skates, -blades, skate boards or bicycles to be operated in buildings.
- No running in the halls
- Burns
 - Serious burns are treated at Burn Center, University of Utah Hospital
 - Aloe Vera sap from plant at the east end of the third floor of JFB might help minor cases.
- Unwanted University property must go to Surplus
 - Contact Harold Simpson at 1-3839 or 801-244-1017 for instructions on forms and other details.

- Use ladders only under conditions for which they were designed.



Not a permitted
use of a ladder!

- Think ergonomics: Lift with your legs, not your back

In Summation

- Always be cognizant of what you need to do to always work safely.
 - Safe work practices
 - Safe equipment
 - Safe workplaces
- If anything can go wrong, it will. So have a plan for dealing with the situation when things go wrong. Plan ahead!

Summary of the safety policy

- 1) Safety training needs to be provided once a year. In general, this is supervisor responsibility. Supervisor determines content and keeps the records.
 - a) Option A: Safety day plus a safety review specific to each lab.
 - b) Option B: Supervisor can provide independent training. Videos plus other info will be available on the dep. website.
 - c) Guest, visitors, undergraduate students must complete the training before working in a lab.
- 2) SOP: Special operational procedures need to be developed and documented if needed.
- 3) All chemicals need to be labeled and inventoried . For each chemical, a group need to have MSDS (material safety data sheet). Chemicals and chemical wastes need to be properly stored.
- 4) If required, the potentially “dangerous” equipment (fume hoods, hoists, lasers ..) need to be certified.

PI, supervisors, personnel must follow safety practice.

To a participant: You do not have to sign the form if you think that you are not properly trained! You might want to review our safety manual, take safety class in Chem. Department, look up material available at the OEHS website.

It is not possible for us to oversee and cover every potentially dangerous situation.