

Lithium Battery Safety

Workers and community members utilize devices with lithium batteries daily. While lithium batteries are generally safe, they can become a fire and/or explosion hazard if defective or damaged.

This curriculum on lithium battery safety can be used as an exercise with the 3AW HAZWOPER Awareness community program or as an awareness-level refresher module for workers in the 8-hour site worker (8HR) or emergency response (ERR) modular refresher programs.

The content can be delivered in-person or synchronously online.

Time Requirement: 90 minutes

Number of Instructors: 1 or more, consistent with ratio shown in Minimum Criteria

Materials

- Lithium Battery Safety PowerPoint
- Whiteboard or equivalent; markers
- Participant Guide – A printed copy of the PowerPoint will serve as the Participant Guide. Print and make copies of the PowerPoint (3-slide Handout option) so participants can take notes and have all content to refer to in the future.
- Technology – computer(s), projector, screen, cables, internet (note the PowerPoint includes a video which may require the internet)
- If possible, bring some lithium batteries to pass around
- Consider also providing the MWC factsheet on Electric Vehicle Safety, available at <https://mwc.umn.edu/catalog/>

Objectives

When completed, participants will be better able to:

- Identify devices that use lithium batteries
- Describe potential risks of lithium batteries
- Identify safe practices for lithium batteries, including use, charging, storage, and disposal
- Identify action steps in case of a lithium battery emergency

Suggested Facilitator Preparation

- Review the Lithium Battery Safety PowerPoint.
- Ensure operation of audiovisual equipment prior to the session.
- Ensure you are able to show the video in the PowerPoint.
- Test web links prior to the session.
- Print copies of PowerPoint (3-slide Handout option) to serve as Participant Guides so participants can take notes and have all content to refer to in the future. Consider also providing the MWC factsheet on Electric Vehicle Safety, available at <https://mwc.umn.edu/catalog/>.
- Check local and/or national news for recent stories about lithium battery fires. These could be used to replace older or less locally relevant stories found in the PowerPoint.
- Ensure you are familiar with the latest guidance regarding lithium battery safety.
- Conduct reconnaissance: Does the participants' workplace have a standard operating procedure (SOP) for lithium batteries? What batteries do they use?

Sample Agenda

PowerPoint	40 minutes
Exercises	45 minutes
Closing	5 minutes

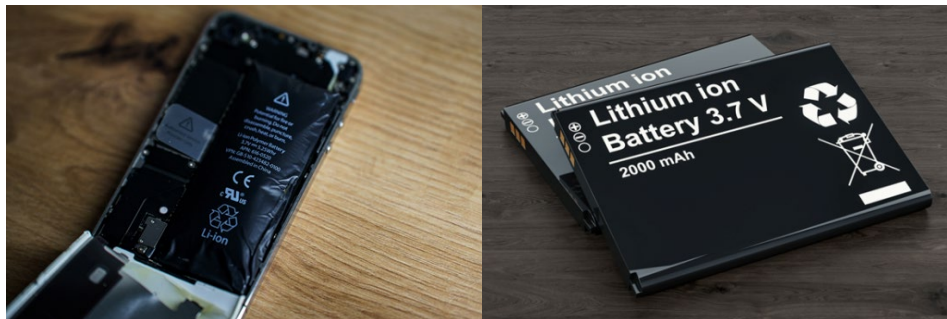
Minimum Content Requirements

- Types and uses of lithium batteries
- Potential hazards of lithium-ion batteries
- Proper use, charging, storage, and disposal of lithium-ion batteries
- Steps in case of emergency with lithium-ion batteries

Question You May Be Asked

How can I identify Lithium-ion batteries?

The battery or device will list its chemistry on the battery's case, instruction manuals, or product markings. There may also be symbols or icons that state the chemistry or the chasing arrow symbol with the words "Li-ion" below it. See examples below.



How do you know when a lithium-ion battery is fully charged?

Most battery chargers indicate when they are charging and when the battery is fully charged. It is recommended you use a charger that includes these features.

Is it safe to use extension cords and multiplug adapters?

Extension cords and multiplug adapters are a fire hazard and should be avoided. They can overheat when overloaded with more than the cord or adapter can handle.

Should lithium-ion batteries be stored fully charged or empty?

The ideal situation is to store lithium-ion batteries at around 50% charge. The usable life of a battery can degrade when fully charged or allowed to discharge to a low state.

Presentation of the Session

The Lithium Battery Safety PowerPoint has been created to assist with delivery of this material. Note there is a link to a video and several websites in the PowerPoint. Be sure to make the distinction between lithium-metal batteries and lithium-ion batteries.

Exercises

Exercises are found in the PowerPoint. Divide participants into small groups to complete the exercises. See guidance below for Exercises 2 and 3. Facilitate a report back after each exercise.

Exercise #2

Scenario 1: You've accidentally punctured the battery on your cordless drill. What should you do?

Read the manufacturer guidance for handling and disposal of damaged batteries. You can also call your local fire department for guidance. Wear PPE (gloves, goggles) if the battery is leaking. Remove the battery from the drill if safe to do so. Temporarily store the battery away from anything that can catch fire, placing sand, dirt or kitty litter over it. It should not come into contact with other batteries. Contact your recycling center for disposal instructions of damaged lithium batteries.

Scenario 2: You left your laptop on a heater and you now notice smoke coming out of it. What should you do?

Read the manufacturer guidance for handling and disposal of damaged batteries. You can also call your local fire department for guidance. Turn off the laptop if it is safe to do so. Wear PPE (gloves, goggles) if it is leaking. Remove the battery from the laptop if safe to do so. Inspect the battery and laptop for damage as perhaps another part of the laptop was smoking, not the battery. Temporarily store the battery away from anything that can catch fire. It should not come into contact with other batteries. You can contact your recycling center for disposal instructions of damaged lithium batteries if necessary.

Scenario 3: You are charging several lithium-ion batteries when you notice they are on fire. What should you do?

Contact 911 if you need assistance. A small lithium battery fire could be extinguished using a class ABC dry chemical extinguisher, a class BC CO₂ extinguisher, or even dirt, sand, or kitty litter. Read the manufacturer instructions for guidance. Separate the batteries from one another and temporarily store them away from anything that can catch fire. You can contact your recycling center for disposal instructions of damaged lithium batteries.

Scenario 4: You are in an accident involving several cars. One of them, a hybrid, is on fire. What should you do?

Get away from the hybrid vehicle and instruct/help others do so as well, if you can do so safely. Call 911.

Exercise #3 (For workplaces only)

Immediate action steps: Call 911 and company safety contact. Keep people away. Depending on fire size and your training, consider moving other flammables away from the fire (other batteries, chemicals etc.). Depending on fire size and your training, consider extinguishing fire.

Evacuation distance: 25 meters (75 feet) in all directions. This may involve other rooms.

PPE: Positive pressure self-contained breathing apparatus (SCBA)

Summary

Review the objectives.

Ask: What takeaways do you have from this course?

Answer any remaining questions.

Make this exercise better:

Forward suggestions to your Program Director

Are there other 'Questions you may be asked' that should be included?

Organize the listing of 'takeaways' and forward to your Program Director. These are very important impacts to report to NIEHS.