Advanced Battery Manufacturing Program

Safety Lesson Plans

The following lesson plans are for a 30+ hour safety program designed to meet the needs of Occupational Safety and Health Standards for General Industry. The program is specifically designed for Advanced Energy Storage Manufacturing operators and technicians. Each individual lesson would be taught in two-hour sessions to meet OSHA compliance. If taught by an authorized General Industry Outreach Training Program Instructor, each student successful in completing the program would be issued an OSHA General Industry 30-hour Safety certification. The program also includes an optional, non-OSHA first aid and CPR course to be taught be another agency. All of the lessons in this curriculum are taught utilizing PowerPoint presentations. In addition, each lesson uses small group activity methods to facilitate classroom discussions and hands-on lab exercises. Included in the resources are various Occupational Safety and Health Administration publications for instructors and students to use as tools and references to prepare for and use in the class. At Grand Rapids Community College, GRCC, many of our instructors are Certified Trainers for the National Center for Construction Education and Research (NCCER). As such, we have access to resources such as **Field Safety**, Upper Saddle River: Pearson/Prentice-Hall, 2006, and associated NCCER assessments. Since these assessments are proprietary, they are not included in this package. Students successful in our GRCC course are also able to get NCCER certifications.

Lesson 1 of 16: Introduction to OSHA

This is a two-hour classroom session to provide students with introductory information about OSHA.

Objectives

Upon completion of this lesson, the student should be able to:

1. Explain why OSHA is important to workers.
2. Explain worker rights under OSHA.
3. Discuss employer responsibilities under OSHA.
4. Discuss the use of OSHA standards
5. Explain how OSHA inspections are conducted.
6. Utilize helpful worker safety and health resources

Lesson 2 of 16: Safety and Health Programs

This is a classroom/ lab session in which the students will discuss effective safety and health programs that address all work related hazards and involve every level of an organization, from workers to managers.

Objectives

Upon completion of this lesson, the student should be able to:

7. Discuss the benefits of an effective safety and health program.
8. Name the four elements of an effective safety and health program.
9. Name three methods to prevent and control workplace hazards.

Lesson 3 of 16: Hazard Mapping

This is a classroom/ lab session in which the students will draw maps of hazards found in various workplaces, identifying types of hazards.

Objectives

Upon completion of this lesson, the student should be able to:

1. Define the term “job hazard”.
2. Identify a variety of health and safety hazards found at typical worksites.
3. Locate various types of hazards in an actual workplace.

Lesson 4 of 16: Personal Protective Equipment

This is a classroom session in which the students will learn to properly use the types of personal protective equipment (PPE) required for their job.

Objectives

Upon completion of this lesson, the student should be able to:

1. Describe the two primary means of protecting employees from workplace hazards prior to considering PPE.
2. Explain what should be included in PPE training
3. List the PPE that may be used to protect workers in general industry.
4. Identify hazards that are lessened or eliminated by using the appropriate PPE for eye, hearing, foot and hand, face, and body protection.

Lesson 5 of 16: Exit Routes and Emergency Action Plans, Fire Protection and Prevention

This is a classroom session in which the students will learn about the essential requirements to provide a safe means of escape from fire and similar emergencies. This lesson deals with the need to have a safe and efficient means of leaving a building under emergency circumstances, with minimal problems finding and using it. Students will also learn the requirements for fire brigades, portable fire extinguishers, fixed fire suppression equipment, fire detection systems , and fire or emergency alarm systems.

Objectives

Upon completion of this lesson, the student should be able to:

1. List and describe the three parts to an appropriate exit route.
2. Discuss at least four characteristics of an effective exit route.
3. Give four reasons for developing an emergency action plan.
4. Name the required elements of a fire prevention plan.
5. List at least four of the five classes of fire extinguishers and the types of fire they can properly extinguish.
6. Describe at least four requirements for proper maintenance of portable fire extinguishers.

Lesson 6 of 16: Electrical Hazards

This is a classroom session in which the students will learn how to recognize and avoid electrical and high voltage hazards. They are also introduced to lockout/tag-out procedures and study the effects of electrical shock on the human body.

Objectives

Upon completion of this lesson, the student should be able to:

1. Describe the risks associated with working around electricity and high voltage.
2. Describe the effects of electrical shock on the human body.
3. Define insulation and grounding.
4. Describe how a ground fault circuit interrupter works and where it is required.
5. Discuss the purpose of an assured equipment grounding conductor program.
6. Define lockout/tag-out and describe how it protects workers.

Lesson 7 of 16: Ergonomics and Manual Material Handling

This is a classroom session in which the students will learn about using proper manual materials handling techniques to avoid injuries.

Objectives

Upon completion of this lesson, the student should be able to:

1. List the three main injuries that occur during material handling, storage, use and disposal.
2. Describe at least two ways to prevent injury when performing manual lifting.
3. Describe at least three actions that can reduce or eliminate hazards when storing, using or disposing of materials.

Lesson 8 of 16: Walking and Working Surfaces

This is a classroom session in which the students will learn how to recognize the hazards, employ the safeguards, and avoid and respond to accidents and injuries related to walking and working surfaces.

Objectives

Upon completion of this lesson, the student should be able to:

1. Identify at least five different slip, trip, and fall hazards associated with walking and working surfaces.
2. Discuss at least five strategies that can be used to control hazards in floors, holes, and cluttered work spaces, stairways, and ladders.
3. Identify different types of ladders and scaffolding.
4. Describe how to safely use ladders and scaffolding.
5. Describe and demonstrate the proper way to set up and climb a ladder.

Lesson 9 of 16: Industrial Hygiene

This is a classroom session in which the students will learn about the science of anticipating, recognizing, evaluating, and controlling workplace conditions that may cause workers' injury or illness.

Objectives

Upon completion of this lesson, the student should be able to:

1. Identify and correct potential safety and environmental hazards in the workplace
2. Identify common safety issues related to hazardous materials that require personal cleanup.
3. Describe how to handle hazardous materials and hazardous waste safely.

Lesson 10 of 16: Flammable and Combustible Liquids

This is a classroom session in which the students will learn about the hazards associated with flammable and combustible liquids, mainly explosions and fires, and

how to prevent these hazards through design and construction, proper ventilation and storage and understanding ignition sources.

Objectives

Upon completion of this lesson, the student should be able to:

1. Define flash point, flammable liquid and combustible liquid.
2. Explain at least two ways to avoid explosion or fire from flammable or combustible liquids.
3. List four potential sources of ignition for flammable and combustible liquids.
4. Identify at least two actions that apply to each of the four components of a good plan for the safe use of flammable and combustible liquids.

Lesson 11 of 16: Hazard Communication

This is a classroom session in which the students will learn about the hazards and safeguards of working with or near hazardous materials. The students will also learn how to read, interpret, and use material safety data sheets (MSDS).

Objectives

Upon completion of this lesson, the student should be able to:

1. Identify different types of warning labels.
2. Explain how a MSDS is used.
3. Identify and apply the safety information on an MSDS.
4. Demonstrate and explain proper on-site safety and emergency-response procedures.

Lesson 12 of 16: Exit Routes and Emergency Action Plans, Fire Protection and Prevention

This is a classroom session in which the students will learn about the essential requirements to provide a safe means of escape from fire and similar emergencies. This lesson deals with the need to have a safe and efficient means of leaving a building under emergency circumstances, with minimal problems finding and using it. Students will also learn the requirements for fire brigades, portable fire extinguishers, fixed fire suppression equipment, fire detection systems, and fire or emergency alarm systems.

Objectives

Upon completion of this lesson, the student should be able to:

1. List and describe the three parts to an appropriate exit route.
2. Discuss at least four characteristics of an effective exit route.

3. Give four reasons for developing an emergency action plan.
4. Name the required elements of a fire prevention plan.
5. List at least four of the five classes of fire extinguishers and the types of fire they can properly extinguish.
6. Describe at least four requirements for proper maintenance of portable fire extinguishers.

Lesson 13 of 16: First Aid and CPR

This is a classroom session in which the students will learn how to administer first aid and CPR. This portion is optional and would be contracted out to the American Red Cross or the American Heart Association.

Lesson 14 of 16: Hand and Power Tool safety

This is a classroom session in which the students will learn how to identify, safely use, and maintain hand and power tools.

Objectives

Upon completion of this lesson, the student should be able to:

1. Identify different types of power tools.
2. Describe the uses of hand and power tools.
3. List the five most common power sources for power tools.
4. Describe the risks associated with hand and power tools.
5. Explain how to minimize the risks associated with these tools.

Lesson 15 of 16: Machine Guarding

This is a classroom session in which the students will learn about the various hazards of mechanical motion and techniques for protecting workers from these motions. Students will learn where mechanical hazards occur, the hazards created by different kinds of motions and the requirements for effective safeguards.

Objectives

Upon completion of this lesson, the student should be able to:

1. Describe at least two of the main causes of machine accidents.
2. List three of the requirements for safeguards.
3. List five machinery parts that pose hazards when unguarded or improperly guarded.

4. List at least five types of machine guards.
5. List at least three types of devices used to safeguard machines

Lesson 16 of 16: Control of Hazardous Energy (Lockout/Tag-out)

This is a classroom/lab session in which the students will learn how to perform the lockout/tag-out process and study the hazards and safeguards associated with lockout/tag-out procedures.

Objectives

Upon completion of this lesson, the student should be able to:

1. Describe the lockout/tag-out procedure
2. Identify common safety hazards associated with lockout/tag-out procedures.
3. Describe the safeguards associated with lockout/tag-out procedures.

Lesson 17: Powered Industrial Vehicles

This is an optional classroom/lab session in which the students will learn the hazards and safeguards of working on or near forklifts and other powered industrial vehicles.

Objectives

Upon completion of this lesson, the student should be able to:

1. Explain the elements of a pre-shift inspection.
2. Describe the practices of safe traveling.
3. Describe the practices for safe load handling.
4. Describe or demonstrate how to operate a forklift safely on ramps and docks.
5. Explain how to work safely around a forklift.

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Workforce Training