Lesson 1: Properly Using Personal Protective Equipment (PPE) to Ensure Safety

For students to be successful in their Core Plus classroom and on any job site, it is crucial they understand the importance of Personal Protective Equipment (PPE) and can identify the necessary PPE for a given task. Having the skills to read and complete a Job Hazard Analysis Forms is also key, this form works as a tool for accident prevention.

Quick Summary:

- ✓ The teacher demonstrates the use of PPE.
- ✓ The class completes a JHA from together, discussing the risks of misused safety equipment and the impact on PPE effectiveness.
- ✓ Students give a presentation on selecting PPE for specific activities along with completing a written JHA form.

Student Learning Objective: I understand the importance of proper PPE usage and can accurately complete a JHA form.

Materials: PPE for teacher demonstration, JHA worksheets, Safety Unit PowerPoint, PPE Visuals
Optional: PPE For Your Body Worksheet, PPE Extra Worksheet, PPE Presentation Template.
For additional resources, review the TEACH Construction "Construction Fundamentals" YouTube Playlist: https://www.youtube.com/watch?v=tM2IWMyI_f8&list=PLfZcU0E-cRgCNNEN-f3TTQrlFmd2DyXIu

Vocabulary: Personal Protective Equipment, Job Hazard Analysis

Standards Alignment: CCSS.ELA-Literacy.CCTA.L1, CCSS.ELA-Literacy.CCTA.L2, CCSS.ELA-Literacy.CCTA.L6, CCSS.ELA-Literacy.CCRA.R.7, CCSS.ELA-Literacy.CCRA.SL.1, CCSS.ELA-Literacy.CCTA.SL.2, CCSS.ELA-Literacy.CCRA.W.2, CCSS.ELA-Literacy.CCTRA.W.4, CCSS.ELA-Literacy.CCRA.W.6., CCSS.ELA-Literacy.CCRA.W.7, CCSS.ELA-Literacy.CCRA.W.10, HS-ETS1-3.

Student Certificate Alignment: *Identify Personal Protection Equipment (PPE) required for assigned tasks; accurately complete a Job Hazard Analysis form for assigned tasking; professional communication—written and verbal; technical reading and writing; work cooperatively with others to maintain a safe environment; respect opinions, customs, and individual differences of others.*

Lesson Structure and Activities:

Warm-Up:

- As a class, or with a partner, students share what they know about PPE.

Differentiation Tip: *Teachers can support student learning with prompts such as: "What might a construction worker use to protect their eyes?" or "What might be needed to protect from a burn?". Teachers can also direct students to the classroom visuals.*

Instructor led presentation:

- Introduce the Term PPE.
- Show video, https://www.youtube.com/watch?v=PFfluLWsabk, and prompt students to remember examples for each body part.

  Differentiation Tip: *Teachers can customize the task by focusing on examples for only one or two body parts. Teachers could also provide the PPE for Your Body worksheet (provided in the Unit Resources Section) and ask students to match the appropriate PPE.*

- Discuss what PPE refers to and how it differs by job site. Refer to slides 6-14 of unit PowerPoint for visuals. The following notes can be used for classroom charts. Teachers can choose to create charts as a class or use the visuals provided in the Unit Resources Section:
  - Personal Protective Equipment, also referred to as PPE, is any equipment or clothing utilized to reduce and prevent injuries to a construction worker. A construction worker is required to wear PPE and ensure that it is regularly inspected, cared for, used properly and not altered. PPE varies depending upon the hazard.
  - Examples include (see provided printable charts):
    - Head protection: helmets, hard hats, protection shells
    - Eye protection: safety glasses, goggles, face shields, welding helmets, full hoods
    - Hand protection: vinyl, neoprene, leather, or cotton-knitted gloves
    - Foot protection: steel-toed, metal free, non-conductive, conductive, rubber, or synthetic boots and shoes, foot guards, heel and ankle shields
    - Ear protection: ear plugs, earmuffs
    - Respiratory protection: respirators, breathing apparatuses
    - Body Protection: Vests, coveralls, full body suits

  Introduce Job Hazard Analysis (JHA)
  - The Occupational Safety and Health Administration defines job hazard analysis as "a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment. Ideally, after you identify uncontrolled hazards, you will take steps to eliminate or reduce them to an acceptable risk level."
  - Job Hazard Analysis forms are used to document this process. This document is used across job sites to prevent risks and ensure safety.

- **Student Activity:**
    - Show students three completed JHA forms, highlighting how these sample JHA forms are all different formats as there are a variety of templates used (These sample forms can be found in the Unit Resources: *JHA For Welding, JHA Ladders, JHA Field Work*).
    - Have students read one JHA independently or in partnerships and share aloud the key information.

      Differentiation Tip*: Teachers can provide flexibility for students by providing the sample JHA with the least text (JHA Ladders). Prompt students to find the answers to these key questions: What is the project? What are three main hazards? How can the risk be minimized?*

- **Class Activity:** Use classroom equipment to model the job hazard analysis process. Show students potential hazards and the commonly used PPE items to prevent injury, highlighting the PPE they will use in your class and the importance of doing so.
    - Have students brainstorm and create scenarios of what would happen if a worker did not have PPE equipment in place. This activity will vary based on your classroom tools and setup. You may choose to complete a JHA form with the class during this discussion.

- Discuss how PPE is used in the field and how it may differ based on the job. Use a chart in your classroom (or type into the one included on the PowerPoint) to write examples.
    - Examples include:
        - **Carpenter**: PPE protects against both safety and health hazards in woodworking. Safety hazards include machine hazards, kickbacks, flying chips/materials, fire hazards and electrical hazards. Therefore, hard hats and work boots (sturdy and slip-resistant) along with safety glasses, goggles, or face shields are all essential. To minimize health risks, including long-term exposure to noise, chemicals (from coatings or finishes) and potential carcinogens from wood dust, carpenters wear earplugs or earmuffs and respirators or masks. Lower back support, leg guards and knee support may also be used to prevent injury.
        - **Welding**: PPE protects against hazards such as burns, heat, sparks, toxic fumes and gases. Eye and face gear as well as welding hand gloves and jackets are essential to protect against sparks and heat. Material must comply with safety standards and welders often wear a fire-resistant cap under their helmet. Earplugs and earmuffs may also be used to protect hearing. Wearing the proper clothing will protect welders from radiation exposure and burns. Heavy, durable pants and required and boots must be leather, steel-toed and meet safety requirements.

- **Tower Crane Operator**: PPE protects Operators against accidents when working at heights, it protects them from a potential fall and minimizes risks. PPE in this role includes a full-body harness and safety lanyard—this is required anytime an Operator is working at heights or climbing up and down the crane. Workers also wear hard hats, heavy-duty work gloves, safety glasses, and steel-toed boots.

Differentiation tip: *To increase engagement, the teacher could provide the safety hazards for each job and ask students to suggest the appropriate PPE. Alternatively, the teacher could offer a choice (ex. "Would a worker need a mask or a face shield to minimize the risk of harm from flying materials?"). The teacher can point students to the classroom visuals to help draw a connection between the name of the PPE and the object.*

- **Discussion Follow Up:** have students work with a partner to discuss how PPE could become damaged on a jobsite. How would that impact the effectiveness? Why is it important to replace damaged PPE? Partners share their thinking with the class.

- **Whole Group Practice:**
  As a class, complete a JHA form for one of the careers discussed. There is a blank JHA form in the unit resources. If possible, model completing a JHA form and reviewing/revising that same form. Challenge students to think about and discuss what might be missing from their initial draft to ensure all potential hazards are listed and prevented.

- **Student Activity:**
  Students produce a short video or give a brief presentation explaining how to correctly select and inspect the right PPE for specific activities; students should demonstrate mastery of the appropriate use and care of PPE. Through this activity, students develop communication skills for explaining technical information.

  Differentiation Tip: *Rather than leaving the task open-ended, teachers can provide a few choices of PPE that might be needed for a specific project and allow students to choose what they think would be the most effective/most needed. Teachers can also support students by providing an optional presentation template (Presentation Template can be found in the Unit Resources Section).*

  This will work as a written assignment by having students first complete a JHA for their selected activity. The JHA form is submitted in addition to their presentation.

  Differentiation Tip: *Teachers can provide more flexibility with the task by assigning a specific job site/project and suggesting possible risks. Encourage students to brainstorm the appropriate PPE on their own. Direct students to review classroom charts for ideas.*

Lesson Differentiation: student accommodations can be made as you see fit or to align with a student IEP; this may include:

- Providing a printed out version of the PowerPoint for students to highlight as you discuss
- Providing students with the option to verbally complete a JHA form.
- Building in choices (ex. "What is the appropriate PPE, mask or face shield?") to prompt students who may need more support in a learning task
- Allowing students to choose if they would like to use technology for their presentation.
- Offering reading support as they review the sample JHA forms. Have students work in pairs or read materials aloud as a class.
- Submitting their PPE presentation in a written format.
- Incorporating visuals throughout instruction. The PowerPoint presentation provides images but simply walking students through the shop and showing the PPE as you discuss it would also provide them with extra context/visuals. Teachers can support students to correctly name PPE by modeling the name and asking the student to repeat the name back to you.
- Having students try on the appropriate PPE for their class shop is a way to make this lesson more hands-on for your kinesthetic learners. Ask students to say the name of each piece of PPE as they try it on to reinforce vocabulary.
- **For Students with More Significant Learning Needs:**
    - Give picture choices when asking questions
    - Work with the SLP or Special Education teacher to add content-specific words to communication device
    - Prepare individual picture cards of each vocabulary word. Use these cards for students to sort (ex. PPE for your head, PPE for your feet, PPE for your body). You can also use the PPE for Your Body Worksheet found in the Unit Resources Section.

Assessment: student assessment is through their PPE presentation and the JHA form they completed. Students must use proper capitalization, punctuation, spelling. See the CPC Writing and Presentation rubric provided in Unit Resources to help grade and provide feedback to presentations. If you are issuing academic credits and you need additional forms of assessment, refer to Core Plus Construction framework for further performance assessments.

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About These Materials

Attribution

To attribute this course reference Associated General Contractors Education Foundation

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Works Cited

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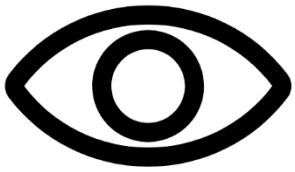
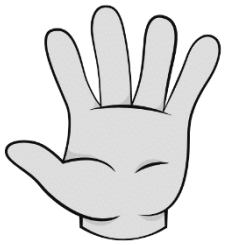
“Personal Protective Equipment: Construction Safety.” Youtube, uploaded by @waconstructioncoe, September 2, 2020, https://www.youtube.com/watch?v=PFfluLWsabk.

"Safety and Health Fact Sheet No. 33: Personal Protective Equipment (PPE) for Welding and Cutting." American Welding Society, 1 Apr. 2014, app.aws.org/technical/facts/FACT-33_2014.pdf. Accessed 3 Oct. 2023.

Name:_____

PPE for Your Body

Directions: Cut out the pictures of the PPE (page 2) and match the PPE to the appropriate body part.

Body Part	**PPE**
Head 	
Eyes 	
Hands 	
Ears 	

PPE for Your Body Continued

Name:_____

Directions: Complete the table below.

PPE	Name of PPE	How does it protect us?
		
		
		
		
		

Unit 5, Lesson 1, PPE Visuals

PPE

Head Protection

PPE:

Eye Protection

PPE:

Hand Protection

Gloves to prevent cuts and burns

PPE:

Foot Protection

Boots (Steel-toed, metal free, non-conductive, rubber)
Foot Guards, Heel and Ankle Shields

PPE:

Ear Protection

PPE:

Respiratory Protection

PPE:

Body Protection

Vests, coveralls, full body suits

Safety Unit Vocabulary

PPE: *Personal Protective Equipment*

Clothing or equipment used to reduce or prevent injuries to a construction worker.

JHA: *Job Hazard Analysis*

A form that identifies hazards and describes necessary steps to eliminate or reduce hazards.

SDS: *Safety Data Sheet*

Document that contains information on safety and health hazards of a job when working with certain chemicals.

Toolbox Talk: Short, informal safety meetings that take place on a job site to promote safety awareness.

SOP: *Standard Operating Procedure*

A set of guidelines that tells workers how a process works, often with step-by-step instructions.

Electricity: The fundamental form of energy observable in positive and negative forms. Created by the flow of an atom's electrons through a conductor (metal, wet surfaces, etc.).

Current: A flow of electrons from a source of voltage through a conductor.

Amperes (amps): The unit of measure used for current.

Direct Current: Current that flows in one direction only, for example, a car battery.

Alternating Current:

Current that flows back and forth and cycles through a conductor.

Voltage: The fundamental force or pressure that causes electricity to flow through a conductor. It is measured in Volts.

Resistance: anything that impedes (slows) the flow of electricity through a conductor. It is measured in ohms.

Ohms Law:

Current =

Voltage/Resistance