

75. Science, Technology, Engineering, and Mathematics Cluster - Hazardous Materials Careers (4 hours)

Purpose/Abstract: To introduce students to careers that work with hazardous materials.			
NCCCS Adult Education Standards: R.3.2.4, R.2.1.3 , W.5.2.1, M.2.2.7			
<p>Learning Objective: <i>By the end of the session, students will be able to:</i></p> <ul style="list-style-type: none"> ● Define hazardous materials careers using basic vocabulary. ● Identify and explain the importance of teamwork and communication skills in hazardous materials careers. ● Demonstrate understanding of safe work practices and guidelines when handling hazardous materials. 			
Soft Skills	problem solving & critical thinking	Resources	<p>47-4041.00 - Hazardous Materials Removal Workers</p> <p>Hazardous Materials Removal Worker Career Video</p> <p>Hazardous Waste Operations and Emergency Response (HAZWOPER) - Preparedness Occupational Safety and Health Administration</p> <p>StayingSafeAtWork2016 Staying Safe at Work.pdf</p> <p>Math: Area & Perimeter Practice Polygon Perimeter Word Problems</p> <p>Handouts:</p>
<p>Additional Materials</p> <ul style="list-style-type: none"> ● Art supplies (glue, glitter, markers, paint, etc.) ● Pencils, paper, and scissors ● Computers for student use 			
Icons	 Activity	 Check-In	 Review

PREPARATION

- Watch [Hazardous Materials Removal Worker Career Video](#) and prepare to introduce the role.
- Review these worksheets on [Education.com](#) and print them for Math practice
 - [Area & Perimeter Practice](#)
 - [Polygon Perimeter Word Problems](#)
- Review [Hazardous Waste Operations and Emergency Response \(HAZWOPER\) - Preparedness |](#)



[Occupational Safety and Health Administration](#) to provide an introduction to OSHA and HAZWOPER. Familiarize yourself with the information found in the workers in the cleanup operations section for the group activity.

- Review [Staying Safe at Work.pdf](#) and prepare a few guiding questions to ask while presenting the slides on staying safe at work.
- Review the [Instructional Support Guide](#) and print/prepare referenced scaffolds.
- Print handouts.
- Familiarize yourself with [O*NET](#)
- Familiarize yourself with [Skills to Pay the Bills](#), though it won't be used directly in this lesson.

INTRODUCTION (30 min)

Welcome students to the class!

Ask students the following questions to activate their prior knowledge:

- *What are some hazardous materials you know?*
- *Do you know what a containment area is? Where have you heard it before?*
- *What do you understand about Personal Protective Equipment? Can you share two examples of PPE?*
- *What is a landfill?*

Inform students that the lesson will focus on careers handling hazardous materials. Give a brief explanation on what hazardous materials are with examples such as, asbestos, lead-based paint, waste oil, fuel, transmission fluid, radioactive materials, or contaminated soil.

Play [Hazardous Materials Removal Worker Career Video](#) and revisit the questions you asked at the start of the class. Provide a summary of the video.

Introduce the objectives of the lesson.

Instructor Note: In this lesson, you will reuse the staying safe at work content that was used in previous lessons. Please plan your explanations keeping earlier discussions in mind.

VOCABULARY, READING & WRITING (45 min)

Introduce these simple definitions for the following words. Project the words and explain what they mean. Ask students to use them in sentences.

- **Contamination** - when harmful or bad things get mixed with something that should be clean or safe.
- **Decontamination** - the process of making something clean and safe again by removing harmful things.
- **Dispose** - to throw away or get rid of something safely.
- **Decommissioning** - when you stop using something and take it apart or shut it down safely because it's not needed anymore.
- **Hazardous Materials** - substances or things that can be very dangerous or harmful to people, animals, or the environment. These materials can cause illness, injury, or damage if not handled or

stored properly.

Project the following passage to explain why problem-solving and critical thinking are crucial skills for careers in Hazardous Materials handling. Instruct students to take turns reading and pause as required to ask probing questions to check for comprehension or provide examples.

Hazardous Materials Removal Workers play a crucial role in keeping our environment safe by dealing with dangerous substances like asbestos and lead. To do this job effectively, they need to have excellent problem-solving and critical thinking skills.

One reason these skills are so important is because Hazardous Materials Removal Workers have to build containment areas before they can start their work. This involves setting up barriers to keep the hazardous materials from spreading. They need to think carefully about the best way to do this and solve any problems that might come up.

Identifying the hazardous materials is another task that requires problem-solving. They use monitoring devices to figure out what needs to be removed. Critical thinking comes into play when deciding the best methods to remove materials like asbestos or lead safely.

Safety is a top priority in this job, and Hazardous Materials Removal Workers must comply with strict procedures and laws. They need to think critically to ensure that they are following all the rules correctly.

When emergencies involving hazardous substances occur, these workers step in to limit the contamination. This requires quick thinking and problem-solving to minimize the harm to people and the environment.

 REFLECTION (15 minutes)

✓ Ask a few follow-up questions and provide additional examples to highlight the importance of problem-solving and critical thinking. Guide a discussion on how one can improve these skills as students and in their daily lives.

Lower Level	Higher Level
<p>Encourage students to take more time to read the passage out loud when it's their turn. Help them break down words if required.</p>	<p>As you read through the passage, have students take notes of the key ideas from each paragraph and provide a summary at the end of reading. Read out this summary and have them check if their notes align: <i>In summary, problem-solving and critical thinking are vital skills for Hazardous Materials Removal Workers. They use these skills to build safe containment areas, identify hazardous materials, comply with safety regulations, and respond to emergencies. Their work helps protect us all from the dangers of hazardous materials.</i></p>

MATHEMATICS (60 min)

Start by telling the students that one of the first things hazardous material removal workers do is to create special areas to keep dangerous materials safe before cleaning them up. Ask the students what skills they think someone needs to build these special areas. Encourage them to share their ideas.

Explain to the students that knowing about the size of the space (area) and how long it is around the edges (perimeter) is really helpful when building these areas.

Discuss with the students why this knowledge of area and perimeter is important for the building task. Encourage them to think about how it helps in creating safe containment areas for hazardous materials.

Distribute [Area & Perimeter Practice](#) and allow 15 minutes for students to work through it. Consider modeling how to provide reasoning for the problems on the page.

Review the answers and provide clarifications.

Assign [Polygon Perimeter Word Problems](#) to students. Select a problem from the worksheet and explain how to solve it. Allow students to work in pairs if required.

 REFLECTION (10 minutes)

✓ Review the answers with the whole class.

Lower Level	Higher Level
Provide individual or small group support on how to calculate the perimeter for polygons.	Encourage students to think about what units might be used while constructing perimeters around containment areas and how these calculations might take place.

GROUP WORK (60 min)

Provide a brief overview of OSHA and Hazardous Waste Operations and Emergency Response (HAZWOPER) using this link: [Hazardous Waste Operations and Emergency Response \(HAZWOPER\) - Preparedness | Occupational Safety and Health Administration](#).

Inform students that they will work in groups to learn more about how HAZWOPER applies to workers in clean-up operations. Tell students that within this category, you will assign sub-categories for each group. Encourage them to identify key points and important details within that category.

Divide students into 7 groups and assign one of the following sections within the ‘Workers in Cleanup Operations’ section.

1. Site-specific Health and Safety Plan (HASP)
2. Site Characterization and Analysis
3. Site Control
4. Medical Examination Frequency - focus on table and key points alone



5. Handling Drums and Containers
6. Decontamination Procedures
7. Sanitation at temporary workplaces

Provide each group with a poster board or large sheet of paper and markers. Instruct them to create a visual representation of their assigned category. They should include key information, bullet points, and illustrations or diagrams if possible.

Ask each group to prepare a brief presentation (2-3 minutes) summarizing the key points and highlights of their assigned category.

 REFLECTION (15 minutes)

✓ Have each group present their posters to the class. Guide a discussion about what they learned through this activity. Discuss how these categories assigned to each group are interrelated and essential for hazardous material removal workers.

Instructor Note: Help each group locate their assigned section on the webpage. This activity allows students to focus on specific sections of the text, work collaboratively, and present information in a simplified manner to their peers. It promotes active engagement with the material and reinforces their understanding of key categories. It is aligned to the reading and the writing standards for this lesson.

INDEPENDENT WORK TIME (30 min)

Inform students you will revisit the staying safe at work presentation from an earlier lesson.

Project [StayingSafeAtWork2016](#) and explain the key points of the presentation. Please use the linked PDF to help prepare a few guiding questions you can use for each slide.

Once you've reviewed the slides with the class, allow students 15 minutes to write why being aware of safety hazards and following safety protocols is important for careers that work with hazardous materials.

Lower Level

Provide sentence starters and consider pairing students up if they'd like to brainstorm ideas.

Higher Level

Encourage students to add more details to their write-ups.

WRAP-UP & REFLECTION (15 min)

Summarize the key ideas discussed in the lesson.

Distribute exit slips to students.

Ask for a few volunteers to share their reflections.

Collect and review the answers.

Reflection Exit Slip

In one sentence, describe what you learned in this lesson.

Today, I learned _____.

Is one of the careers discussed today of interest to you? Why or why not?

I liked / did not like _____ career because _____

Is there anything you still need help understanding?

What's one question you have?

Circle the emoji that shows how you feel about your mastery of content in this lesson.



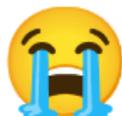
Happy



Smart



Confused



Sad



Angry