Benzene is a clear, colorless liquid with a sweet odor. It is a natural component of crude oil and refined petroleum, volcanic emissions, and cigarette smoke.
Benzene is potentially toxic, flammable, and unstable. It is a carcinogen, which means it can cause cancer.
Sources of benzene exposure can include:
- Industrial process emissions
- Cigarette/cigar smoke inhalation
- Gas stations
- Motor vehicle exhaust fumes
- Oil-based liquids and solvents
You can be **exposed** to benzene through inhalation, ingestion, and skin absorption.

**Inhalation** is the most common route of exposure.
Symptoms of benzene exposure can include:

- Blood disorders
- Headaches and dizziness
- Nausea
- Eye, nose, and throat irritation
- Euphoria or giddiness
- Convulsions and loss of consciousness
The Occupational Safety and Health Administration (OSHA) sets **permissible exposure limits** (PELs) on certain chemicals.

**OSHA** limits workplace exposure to benzene in the air to:
- 1 part per million (ppm) during an 8-hour time-weighted average
- A maximum of 5 ppm for 15 minutes for a short-term exposure limit (STEL)
Your company must develop a benzene program to protect workers when the benzene concentration is above the PEL.

A benzene program requires your company to monitor benzene levels and report the results.
Your company must:

- Set up controls
- Monitor affected workers
- Remove overexposed workers
- Maintain documents and records

Affected workers must be notified of the results of monitoring within 15 working days after their company receives the results.
If your job will include working in an area where benzene is present, your company must train you before you begin work and yearly after that.
Your company must meet minimum hazard communication requirements, set up regulated benzene areas, and post warning signs.
Other **hazard controls** for benzene include:
- Providing ventilation
- Eyewash stations
- Substituting less hazardous substances
- Using personal protective equipment (PPE), including protective gloves and suits and respirators
Before handling benzene, you should be properly trained on any handling and storage requirements:

- Store in tightly closed containers in a cool, well ventilated area away from ignition sources of any kind
- Handle with care using proper grounding and bonding because of the chemical’s unstable behavior
If engineering controls and work practices cannot reduce worker exposure below the PEL, workers must use appropriate respiratory protection.

**Review** the chart on slide 15 to find out what type of respirator to wear for different benzene concentrations.
<table>
<thead>
<tr>
<th>Airborne Concentration</th>
<th>Required Respirator</th>
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<tbody>
<tr>
<td>10 ppm or less</td>
<td>• Half-mask air-purifying respirator with organic vapor cartridges</td>
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<tr>
<td>50 ppm or less</td>
<td>• Full-facepiece respirator with organic vapor cartridges OR full-facepiece gas mask with chin-style canisters</td>
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<tr>
<td>100 ppm or less</td>
<td>• Full-facepiece powered air-purifying respirator with organic vapor canisters</td>
</tr>
<tr>
<td>1,000 ppm or less</td>
<td>• Supplied-air respirator with full facepiece in positive-pressure mode</td>
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<tr>
<td>Greater than 1,000 ppm</td>
<td>• Self-contained breathing apparatus with full facepiece in positive pressure mode OR full-facepiece positive-pressure supplied-air respirator with auxiliary self-contained air supply</td>
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</table>
In case of an emergency, **do not** respond above your level of training.

**Be aware** that benzene is highly flammable and can become violently explosive under the right conditions.
Benzene is a hazardous chemical that can have harmful effects on workers who are exposed to it.

Your company should have a benzene program in place to protect workers if the chemical is above the PEL. Always wear and use appropriate PPE and respiratory protection when required.
1. ______________ is a clear, colorless liquid with a sweet odor.
   A. Benzene
   B. Hydrogen sulfide
   C. Asbestos
   D. Lead

2. Benzene is a carcinogen, which means it can cause ______________.
   A. Asbestosis
   B. Lead poisoning
   C. Cancer
   D. Silicosis

3. The most common route of benzene exposure is ______________.
   A. Ingestion
   B. Injection
   C. Inhalation
   D. Skin absorption

4. ______________ sets permissible exposure limits for certain chemicals.
   A. The American National Standards Institute (ANSI)
   B. The Occupational Safety and Health Administration (OSHA)
   C. The National Institute for Occupational Safety and Health (NIOSH)
   D. The Environmental Protection Agency (EPA)

5. The Occupational Safety and Health Administration limits workplace exposure to benzene in the air to __________ ppm during an 8-hour time-weighted average.
   A. 1 ppm
   B. 10 ppm
   C. 100 ppm
   D. 1,000 ppm

6. The short-term exposure limit for benzene is __________ for 15 minutes.
   A. 5 ppm
   B. 10 ppm
   C. 15 ppm
   D. 20 ppm

7. Affected workers must be notified of the results of monitoring within __________ working day(s) after their company receives the results.
   A. 1
   B. 5
   C. 10
   D. 15

8. If your job will include working in an area where benzene is present, your company must train you ______________.
   A. Once
   B. Twice a year
   C. Before you begin work and every 3 years
   D. Before you begin work and yearly after that

9. ______________ must meet minimum hazard communication requirements, set up regulated benzene areas, and post warning signs.
   A. Manufacturers
   B. You and your coworkers
   C. Your company
   D. Your supervisor

10. If engineering controls and work practices cannot reduce worker exposure to benzene below the permissible exposure limit, workers must use appropriate ______________.
    A. Respiratory protection
    B. Foot protection
    C. Hand protection
    D. Eye protection
Instructors: The following key shows the answers for the Benzene safety meeting quiz.

1. A
2. C
3. C
4. B
5. A
6. A
7. D
8. D
9. C
10. A
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<th>INSTRUCTOR NAME</th>
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Student Instructions: Print and sign your name. Also, provide your date of birth or the last four digits of your social security number.

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<th>STUDENT SIGNATURE</th>
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