## UNIT INSTRUCTOR INFORMATION

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## UNIT INTRODUCTION

This module will focus on basic fire knowledge and safety, including the three ingredients needed to start a fire and then how to properly extinguish a fire. Participants will also practice the proper technique of using a fire extinguisher.

The Overall Fire Picture in the US – 2010

- 3,120 civilians lost their lives as the result of fire.
- 17,720 civilian injuries occurred as the result of fire.
- Fire killed more Americans than all natural disasters combined.
- 84 percent of all civilian fire deaths occurred in residences.
- There were an estimated 1.3 million fires.
- Direct property loss due to fires was estimated at $11.6 billion.
- An estimated 32,500 intentionally set structure fires resulted in 295 civilian deaths.
- Intentionally set structure fires resulted in an estimated $733 million in property damage.

In NYC, fire deaths totaled 73 individuals in 2009. This was down 15% from 2008. The leading cause of death in 2008 was due to careless smoking. According to NYC Fire Commissioner Salvatore Cassano, the top three contributing factors to fires in NYC are candles, overloaded electrical circuits and careless smoking.

In this unit, we will discuss fire safety for you and your household. We will also discuss CERT roles during a fire-based deployment. During and immediately following a severe emergency, the major priorities of the FDNY are life safety and extinguishing major fires. In a major disaster, first responders may be taxed by the number of incidents or hampered by impassable roads, inadequate water supply or weather conditions. CERT may be asked to support the FDNY.

CERTs may be tasked to play a very important role in fire safety by:

- Extinguishing small fires before they become major fires. This unit will provide training on how to use an extinguisher to put out small fires—and how to recognize when a fire is too big for CERT members to handle.
- Preventing additional fires by removing fuel sources. This unit will also describe how to ensure that a fire, once extinguished, is completely extinguished.
- Shutting off utilities, when necessary and safe to do so, based on your CERT training.
- Assisting with evacuations where necessary. When a fire is beyond the ability of CERT members to extinguish, CERT members need to protect life safety by evacuating the area, when necessary, and establishing a perimeter.

When deployed, CERT members should remember the following:

- CERT member safety is always the number one priority.
- NYC CERT members should always work within the buddy system.
- Each member must wear safety equipment, including gloves, helmet and goggles.
- Each member must operate within the scope of his or her CERT fire safety training.
- When operating a fire extinguisher, always operate with a back up safety team and ensure a safe means of egress.

## UNIT OBJECTIVES

- Learn the chemistry of fire.
- Know how CERT teams can aid in fire prevention in their community.
- Understand CERT's role in fire suppression.
- Learn and practice safe fire extinguishing techniques.

## UNIT REVIEW

Fires can happen anywhere, and at this point, you know some of the context of where they can start and spread, how to reach help and ways they can start (utilities). Keep in mind that you can prepare in your own home for fires by practicing evacuation routes, having a meeting place, and having your Go Bag ready!

## LOOKING FORWARD

Building collapses can occur following fires, earthquakes, utility explosions, or even because the subway is rumbling beneath an unstable building. Next week you will learn basic light search and rescue techniques. While this is not training that will allow you to ever enter an unstable building or into an active disaster site, learning and knowing these skills may some day save your life.

**Key Points**

- The intent of this unit is to familiarize students with the importance of fire safety and their personal ability to limit the spread of fire.
- We will also instruct students on the proper use of a portable fire extinguisher on a small fire.
- We will also discuss possible CERT roles during a fire.

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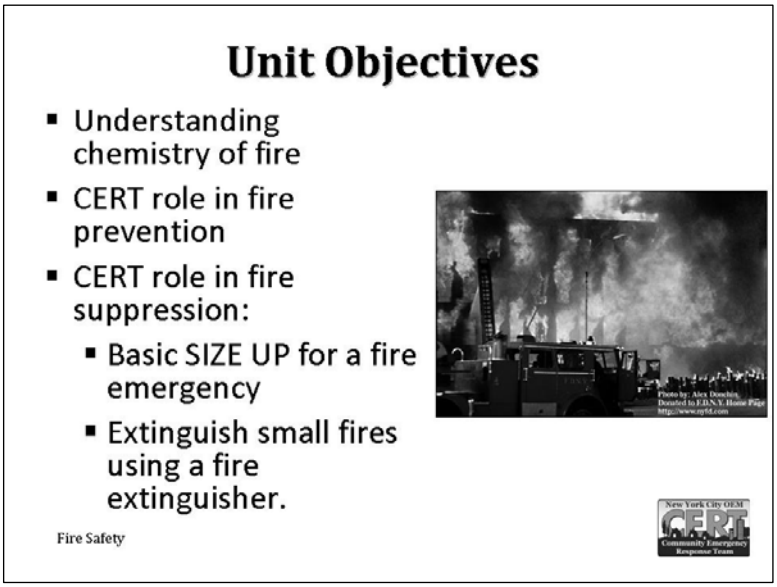


**Key Points**

- By the end of this unit you should able to:
    1. Understand the chemistry of fire and its impact on sustaining combustion.
    2. Understand CERTs' roles in preventing fires in their communities.
    3. Understand the role of a CERT during a fire.
    4. Extinguish a minor fire using a portable dry chemical extinguisher.

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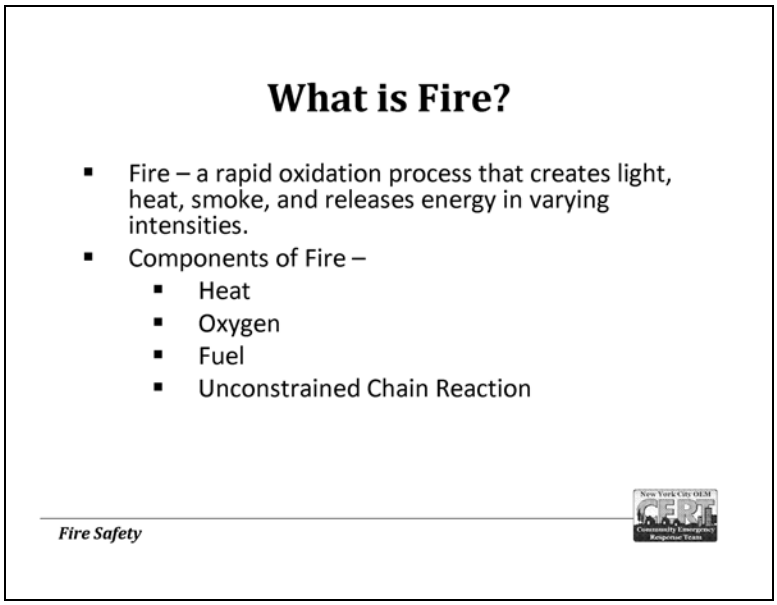


**Key Points**

- Fire is a chemical reaction that requires three components to sustain combustion:
  1. Fuel (solid, liquid, or gas)
  2. Heat (required to elevate the temperature of the material to its ignition point)
  3. Oxygen (fire burns vigorously in any atmosphere of at least 20% oxygen)
- The removal of any one of these components will extinguish the fire.

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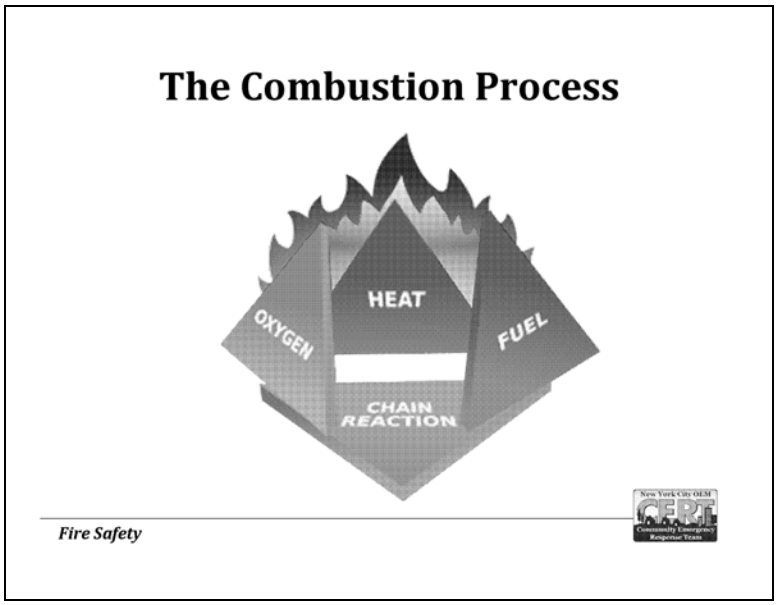


**Key Points**

- The fire tetrahedron diagram illustrates the chemical reaction required to initiate and sustain combustion.
- The simplest example of this reaction would be a match and striker:
    1. The match stick acts as the fuel.
    2. The match dragging along the striker creates the heat.
    3. The oxygen exists in the air at a level of approximately 20%.
    4. The chemical reaction is the interaction of these three components working simultaneously to ignite and sustain combustion.

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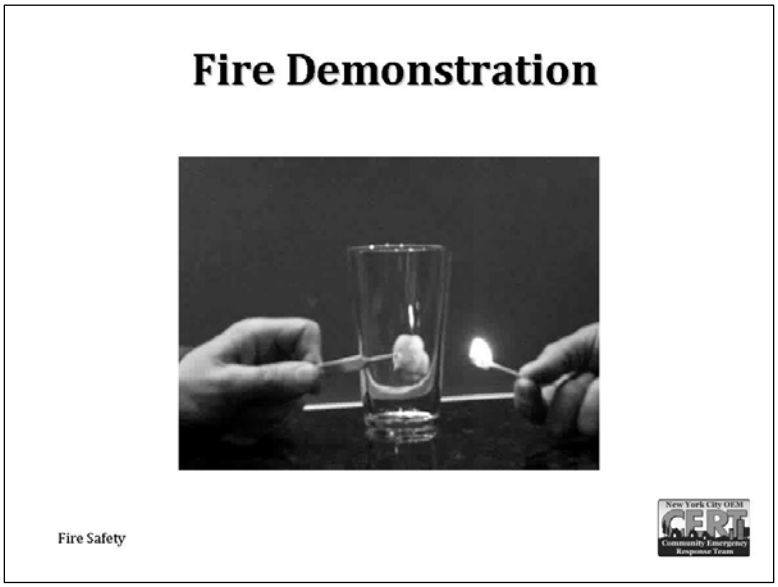


**Key Points**

- Eliminating one portion of the fire triangle will extinguish the fire:
  - Closing a door to the room that is engulfed in fire begins to eliminate the oxygen within the room.
  - Placing water on the fire will cool the heat component and will extinguish the fire.
  - Removing the fuel source will extinguish the fire.

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**Key Points**

- A fire doubles in size every 30 seconds.
- Smoke detectors within the apartment may not activate until the fire is burning for several minutes.
- Once a fire is detected, you should immediately close the door to the fire area to limit its spread.
- If the fire is any bigger than a waste paper basket or beyond the capability of a fire extinguisher, the occupants should immediately leave, closing the door behind them to limit the spread of the fire.
- The occupants should call 911 and attempt to meet first responders in a safe place as they arrive to relay important information about the fire or the occupancy of the building.

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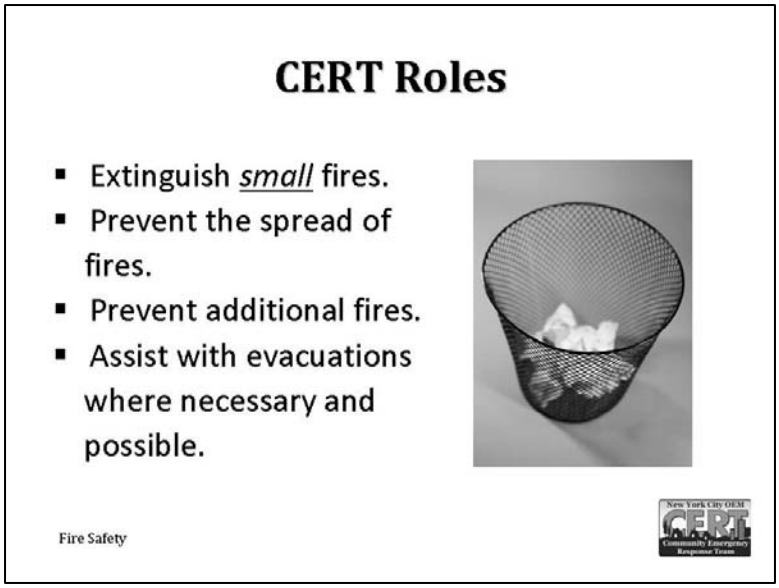


**Key Points**

- CERT members should examine each emergency and determine which tasks are within the scope of their training and safety and will have the greatest impact on the largest number of people.
- Extinguish small fires prior to their exponential growth.
- Attempt to limit the spread of fires that cannot be extinguished by a portable extinguisher.
- Prevent evacuees from blocking exits and stairwells once they have reached a safe area.

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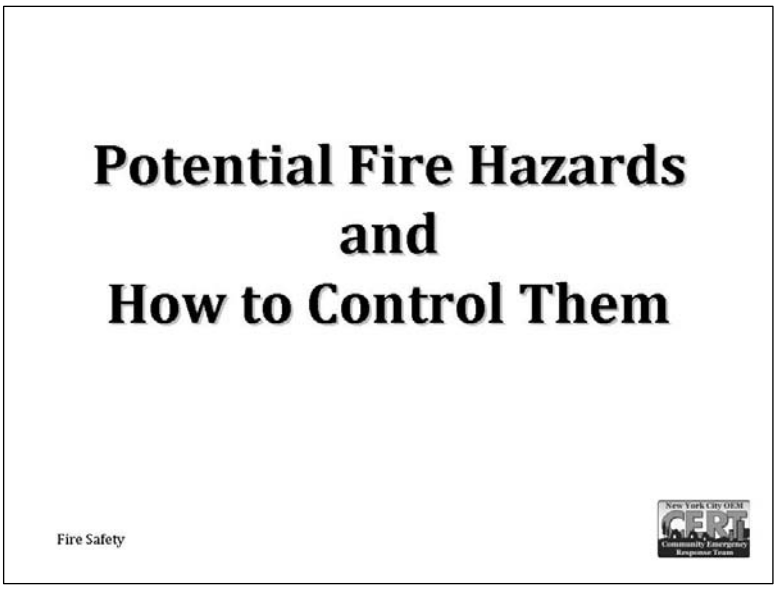


**Key Points**

- Knowing potential fire hazards and the ways to control them increases your personal awareness of fire safety.
- We will also discuss CERT roles in limiting potential fire hazards within their community by educating others on the risks.

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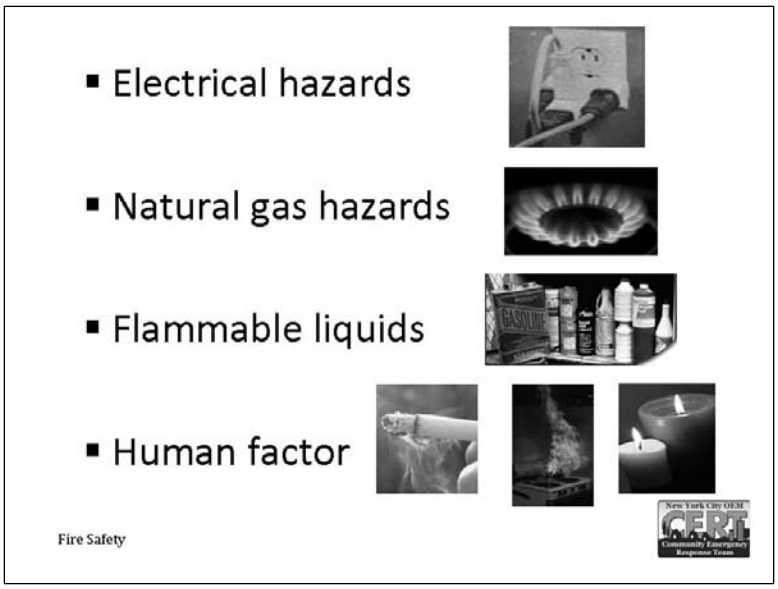


**Key Points**

- These are four types of hazards that contribute to accidental fires.
- These resources are a part of every day life, but when they are used improperly or overloaded beyond their limits they can initiate or expand an existing fire.
- Recognizing the dangers of these four hazards will help in limiting their potential danger.

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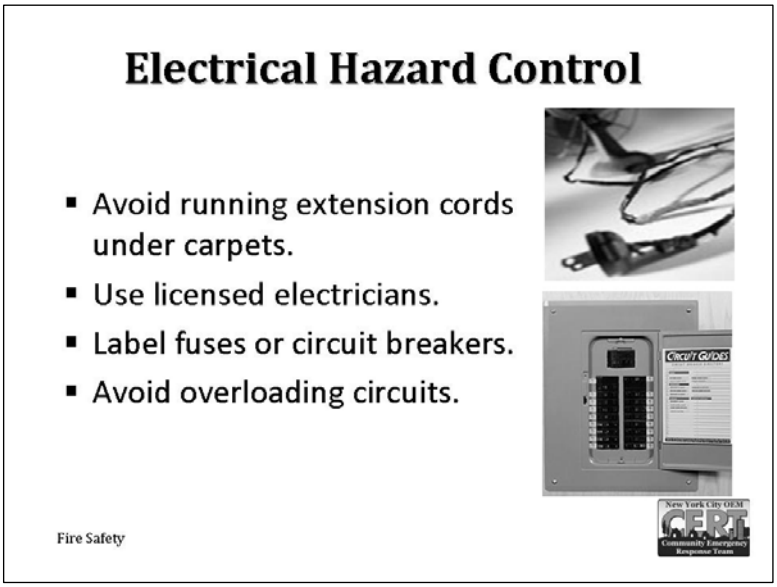


**Key Points**

- The items above are common hazards found in many homes.
- Running electrical cords beneath a carpet causes the insulation to break down over time. This will eventually heat the carpet which will break down its fibers and cause it to ignite more easily.
- Unlicensed electricians may install wiring or appliances that do not meet NYC code requirements which can lead to many potential hazards such as:
    1. Overloaded circuits;
    2. Improper circuit breaker size;
    3. Improper connections; and
    4. Overheated wiring.
- Labeling circuit breakers will enable you to isolate the problem quickly.
- Do not enter a flooded basement to shut off the electrical supply as water may conduct electricity.

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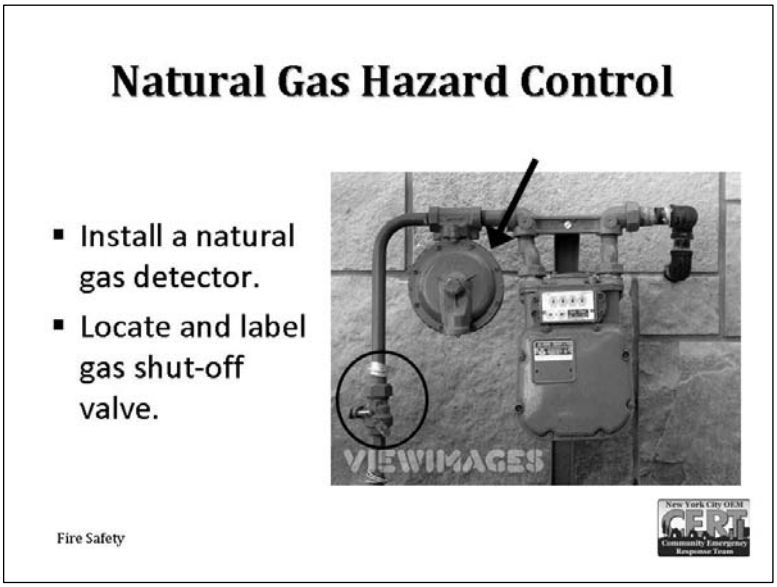


**Key Points**

- Natural gas leaks can be detected by a noticeable odor of rotten eggs; this is an additive known as mercaptan which is added by the gas company so the leak can be detected at extremely low levels. Natural gas has no odor.
- In the event of a gas leak the mercaptan may be scrubbed out as natural gas seeps through the ground, thereby eliminating the odor, leaving it unnoticeable and only detectable by a gas detector.
- If gas valves are labeled, they can be easily located during an emergency and quickly closed to mitigate the disaster.
- A natural gas fire should only be extinguished if you can shut off the gas source safely.
- If a gas leak cannot be controlled, the fire will be allowed to burn and the surrounding area will be made safe by wetting it down.
- Two hazards associated with a natural gas leak:
    1. Asphyxiant that robs the body of oxygen
    2. Explosive that can easily ignite

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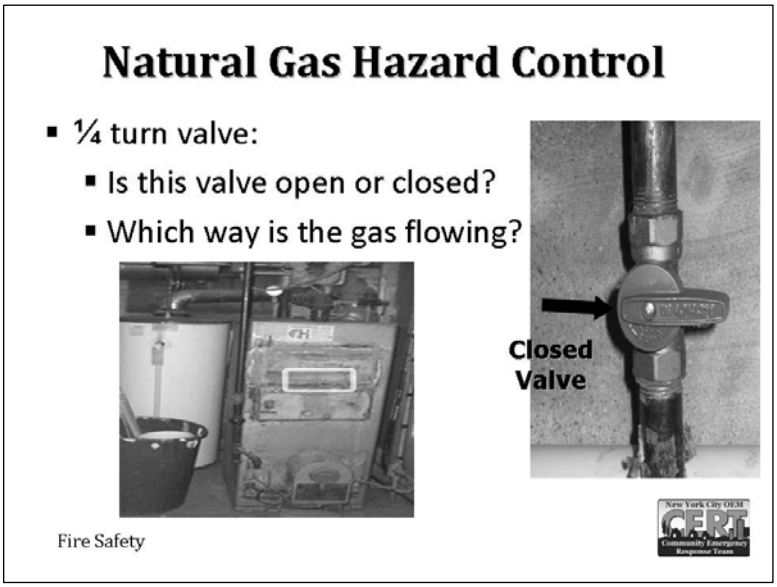


**Key Points**

- There are several types of gas valves used, but the most common is the ¼ turn valve.
- Gas valves can be found in many locations:
  - Behind an appliance
  - In the ceiling
  - At the meter or
  - Where the gas enters the building.
- When the valve is in line with the pipe, it is open.
- When the valve is perpendicular to the pipe, it is closed.
- Many valve stops are broken so do not turn beyond the ¼ turn or you may reopen the valve.
- Always attempt to shut off the gas as close to the leak as possible.

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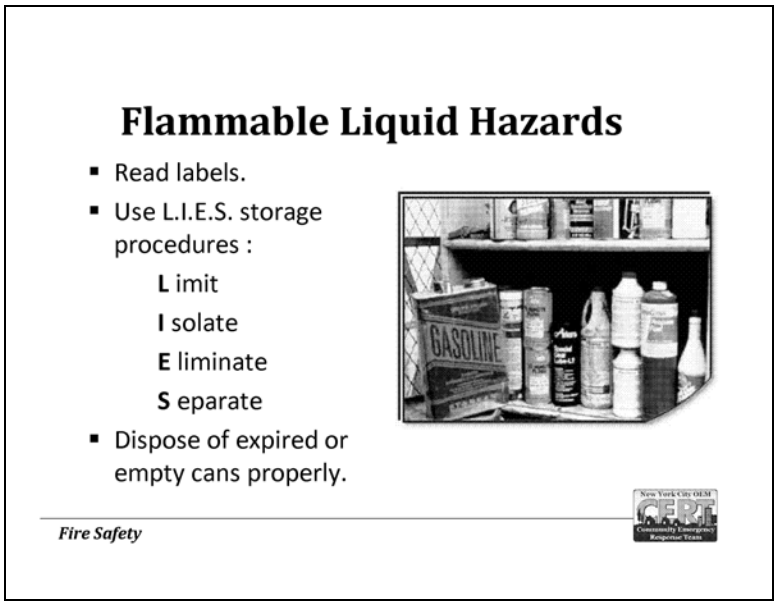


**Key Points**

- CERT members should be aware of labels that identify flammable products.
- Liquids should be stored in the proper container. Some liquids may have a reaction to a container if stored in something other than what they are meant to be stored in.
- Dispose of flammable liquids that may be expired. Consult 311 for instructions on how to dispose of these items safely.
- A trained CERT member should use the LIES acronym when it comes to storing flammable liquids:
    - **L** Limit
    - **I** Isolate
    - **E** Eliminate
    - **S** Separate

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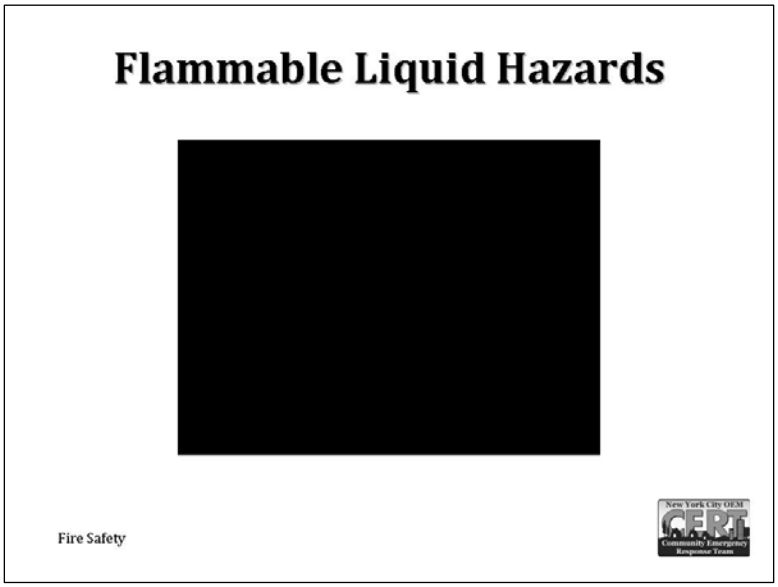


**Key Points**

- This video will demonstrate how dangerous a flammable liquid fire can become and how quickly conditions can change.
- A flammable liquid fire should be extinguished by using a portable fire extinguisher that is rated for flammable liquid fires. (Fire extinguisher safety and ratings will be addressed later in this unit).
- A flammable liquid fire in a cooking pan may be extinguished by placing the lid over the pan if possible.

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**Key Points**

- You can play a part in fire safety.
- NYC CERT members should work to educate their communities about fire safety.

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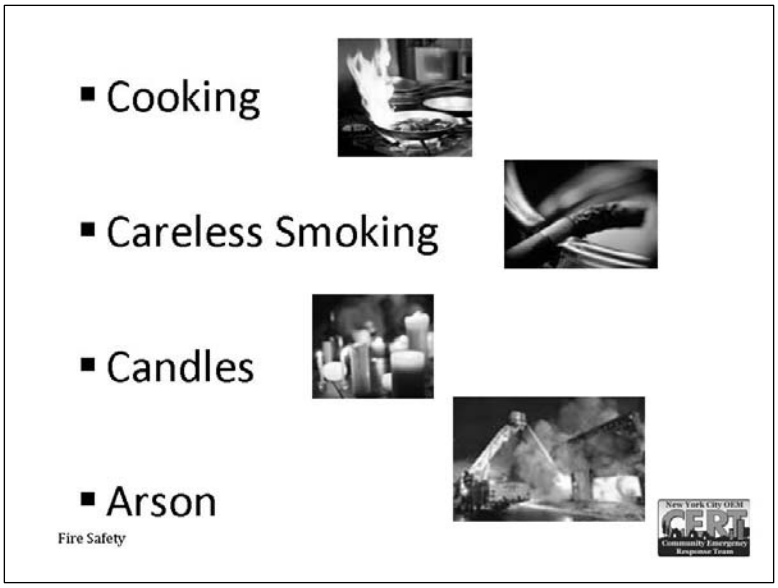


**Key Points**

- COOKING is the leading cause of home fires and injuries in the United States. Cooking fires often result from unattended cooking and human error, rather than mechanical failure of stoves or ovens.
- CARELESS SMOKING is the leading cause of fire deaths. Smoke alarms, smolder-resistant bedding and upholstered furniture are significant fire deterrents.
- HEATING is the second leading cause of residential fires and ties with arson as the second leading cause of fire deaths. Heating fires are a larger problem in single family homes than in apartments. Unlike apartments, the heating systems in single family homes are often not professionally maintained.
- CANDLES must be used with tremendous care. They should be kept on a stable base, away from other flammables.
- ARSON is the third leading cause of residential fires and the second leading cause of residential fire deaths. In commercial properties, arson is the major cause of deaths, injuries, and dollar loss.

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**Key Points**

- Every CERT operation begins with a competent size up.
- When it comes to sizing up a fire, a good rule of thumb for CERT members is if the fire is bigger than a waste paper basket, it is too big for CERT members to attempt to extinguish.

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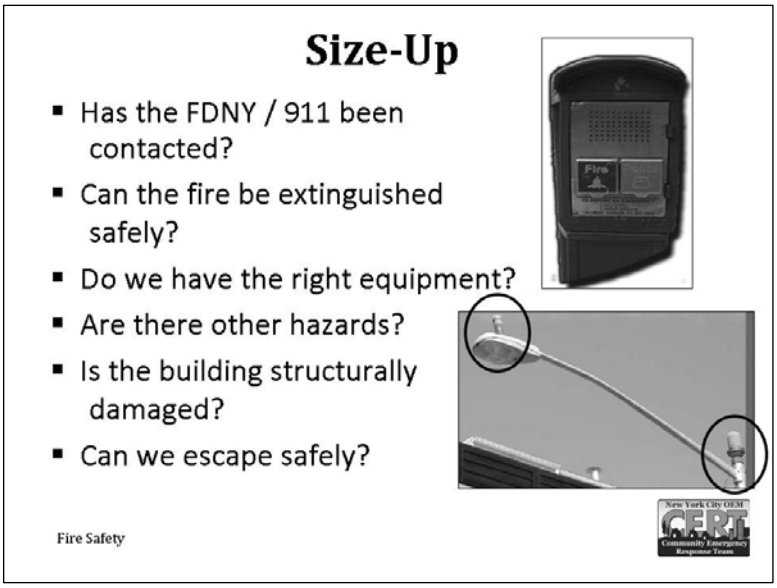


**Key Points**

- Before CERT members attempt to use a fire extinguisher, they should consider the following:
  - Has 911 been contacted?
  - Can this be done safely?
  - Do we have the proper extinguisher and equipment?
  - Are there other hazards that we should be aware of?
  - Is the building structurally safe and sound?
  - Do we have an escape route planned?

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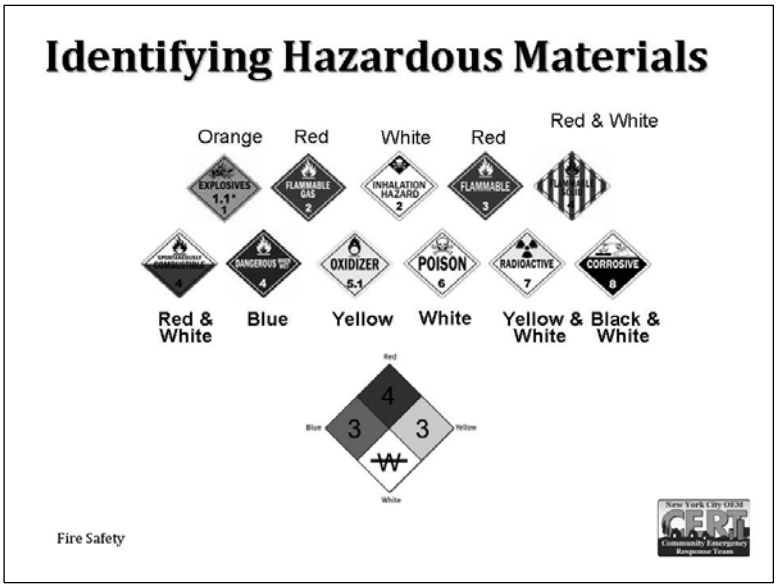


**Key Points**

- Scene safety is important in any emergency situation, but especially so in HAZMAT (hazardous materials) incidents.
- CERT members should be aware of the warning signs that may indicate hazardous materials.
- HAZMAT warning placards should serve as a **stop sign** for CERT members.
- CERT members should attempt to collect as much information as possible for first responders including placard numbers, shapes and colors.
- CERT members should be reminded that they should be positioned at a safe distance which is uphill, upwind, and upstream during any type of HAZMAT incident.

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**Key Points**

- The most likely firefighting resource for CERT members is a fire extinguisher.
- Pots or buckets of water may also be used.
- Another action that CERT members may consider is to confine the fire and restrict the threat of smoke and heat by closing doors.
- CERT members are not trained to operate standpipe hand lines and using them should **never** be considered by CERT members and teams.

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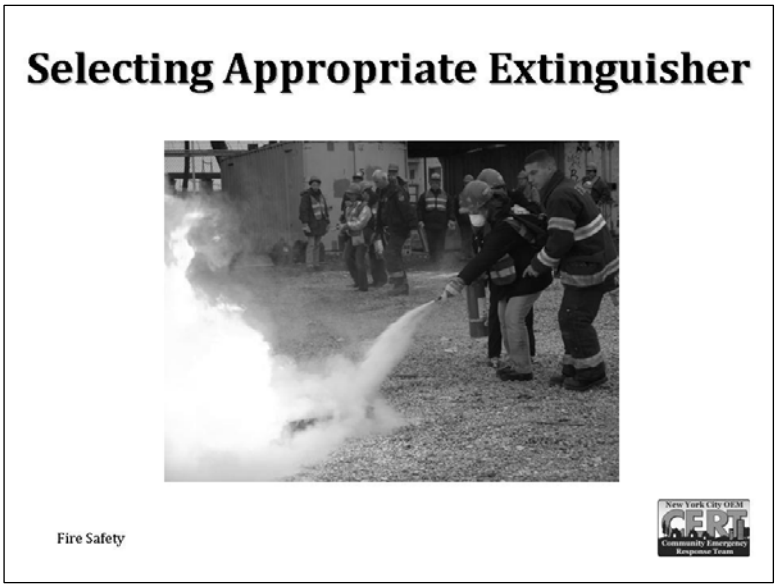


**Key Points**

- A NYC CERT member must have received training in the operation of a fire extinguisher and be properly equipped with personal protective equipment before considering the use of a fire extinguisher.
- CERT members should operate using the buddy system as well as a back-up team when placing fire extinguishers into operation.
- To overhaul means to examine thoroughly or to haul or turn over the material which was on fire.
- Remember to overhaul to ensure that the fire has truly been extinguished.

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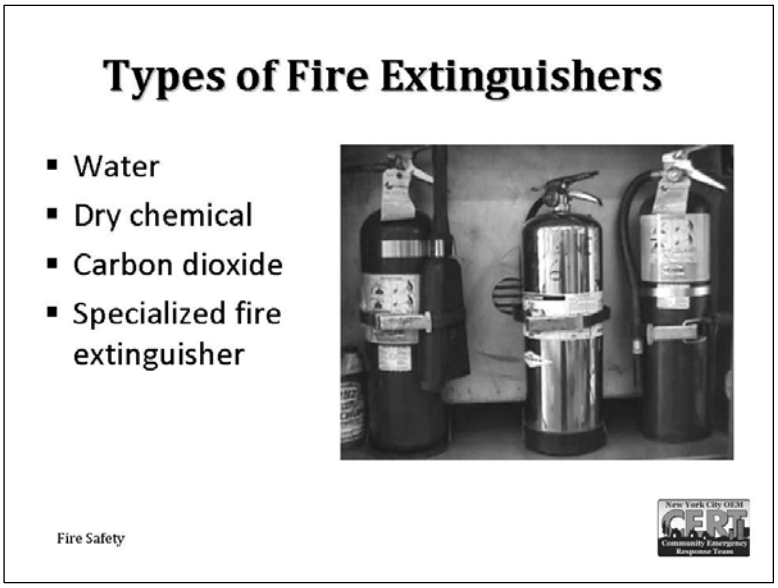


**Key Points**

- The two most common types of extinguishers are water and dry chemical.
- For the average homeowner, the dry chemical extinguisher will be most versatile.
- A multipurpose dry chemical extinguisher will have a mono-ammonium phosphate base and is effective on Class A, B, and C fires.
- Common characteristics of a dry chemical extinguisher include:
    - Capacity (approximately 10-20 seconds discharge time depending on the weight of the extinguisher)
    - Range (8 – 10 feet)
    - Pressure (standard pressure is 175-250 psi)

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| Type of Fire | Extinguishing | |
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| | Agent | Method |
| Ordinary Solid Materials | Water | Removes heat |
| | Foam | Removes air ($O_2$) and heat |
| A | Dry chemical | Breaks chain reaction |
| Flammable Liquids | Foam / $CO_2$ | Removes air (Oxygen) |
| B | Dry chemical | Breaks chain reaction |
| Electrical Equipment | $CO_2$ | Removes air (Oxygen) |
| C | Dry chemical | Breaks chain reaction |
| Combustible Metals | Special agents | Usually remove air |
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Fire Safety

## Key Points

- To aid in choosing the correct extinguisher, fires are categorized into classes based on the type of fuel that is burning:
  - Class A – ordinary combustibles such as paper, cloth, wood, rubber.
  - Class B – flammable liquids such as oils, gasoline, kerosene.
  - Class C – energized electrical equipment such as wiring or motors.
  - Class D – combustible metals such as aluminum or magnesium.

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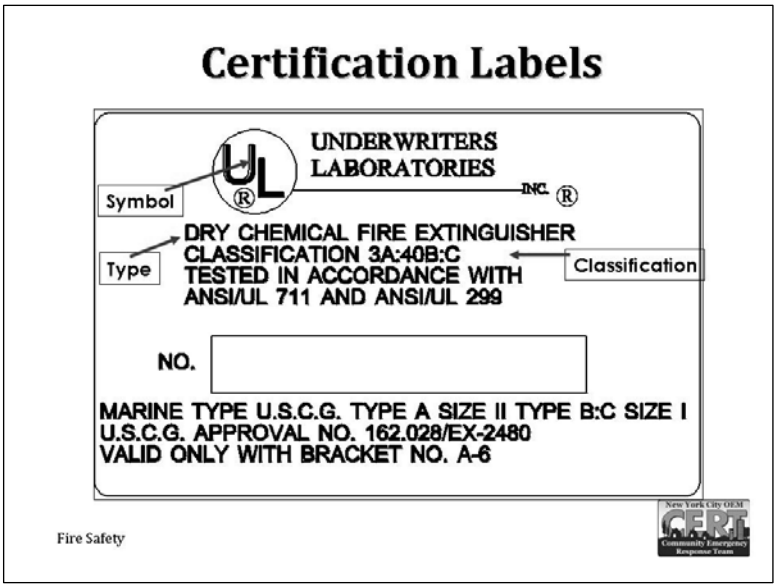


**Key Points**

- The UL on the label indicates Underwriters Laboratories. UL is a privately-owned and operated product safety testing and certification organization. UL develops standards and test procedures for products, materials, components, assemblies, tools and equipment, chiefly dealing with product safety. UL is one of several companies approved for such testing by the Occupational Safety and Health Administration (OSHA – the main federal agency charged with the enforcement of safety and health legislation).
- Fire extinguishers are rated based on their effectiveness on different classes of fires. Every household extinguisher will be labeled A, B, or C which tells you which types of fires the extinguisher is effective against. For example: B is for flammable liquids such as gasoline or cooking oil.
- In the fine print on the label the letters are preceded by numbers. In the example in the slide the numbers are 3A:40B:C which are the extinguisher's classification rating. These numbers are assigned by UL. The higher the number the greater the effectiveness.
- The numbers on the label represent the area the extinguisher will cover. Class A is measured in cubic feet (1A equals 8 cubic feet.) Class B fires are measured in square feet (10B equals 10 square feet – 1B can extinguish 1 sq. ft. of flammable liquid). There is no area measurement for Class C. It means that the extinguisher's chemicals will not conduct electricity.

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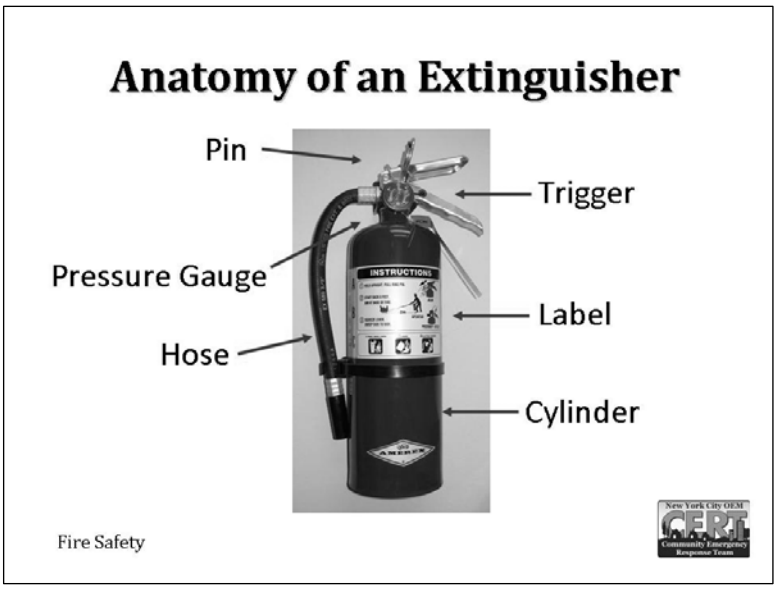


**Key Points**

- The cylinder holds the extinguishing agent and needs to be pressure-tested every five years.
- The pressure gauge indicates whether the extinguisher is charged. The gauge is color coded and green means go.
- The label will tell you what type of extinguisher it is and if it is UL rated.
- The pin needs to be pulled to allow the trigger to be operated.
- The hose should be aimed at the base of the fire.
- The trigger needs to be squeezed.
- The hose needs to be swept across the base of the fire.

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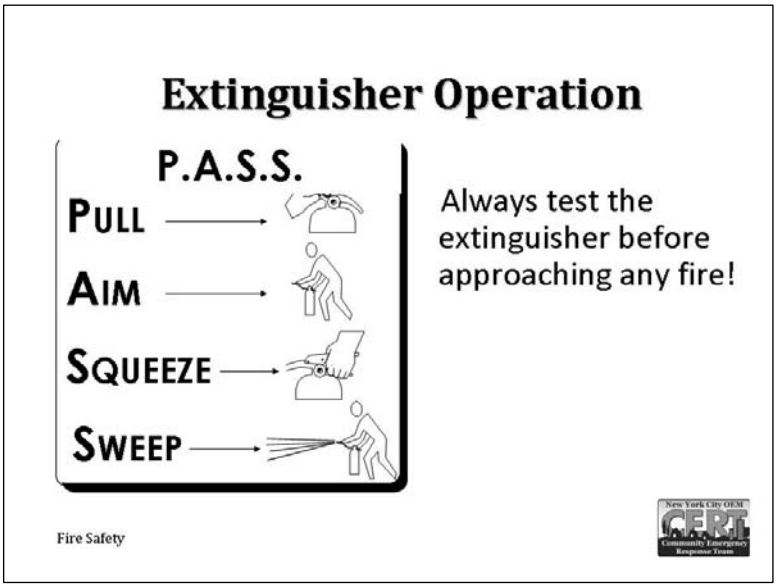


**Key Points**

- Before attempting to extinguish a fire, check the pressure gauge to be sure the extinguisher is charged and squeeze the trigger to quickly test it.
- Make sure you are between the fire and your primary means of egress.
- Always operate a fire extinguisher in the upright position.

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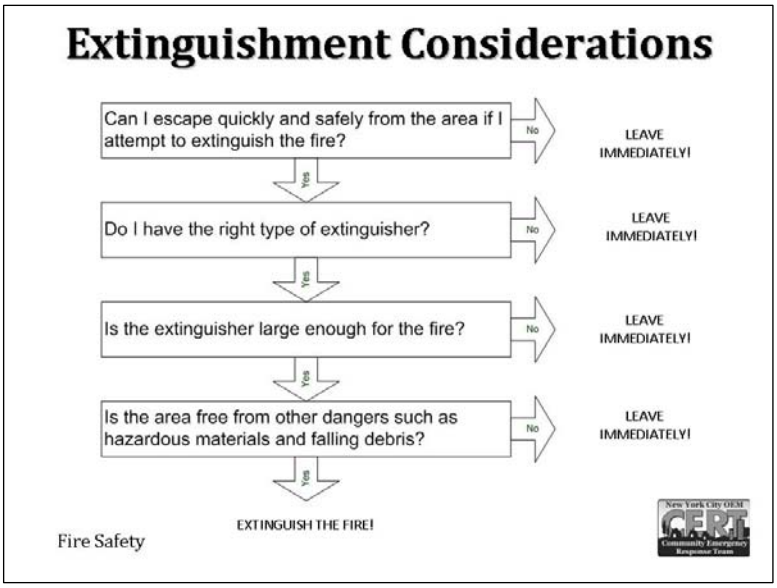


**Key Points**

- You must answer yes to all the above questions before you attempt to extinguish a small fire.
- Even if you answered yes to all the above questions but you feel overwhelmed by the fire, close the door to the fire area and get out immediately.

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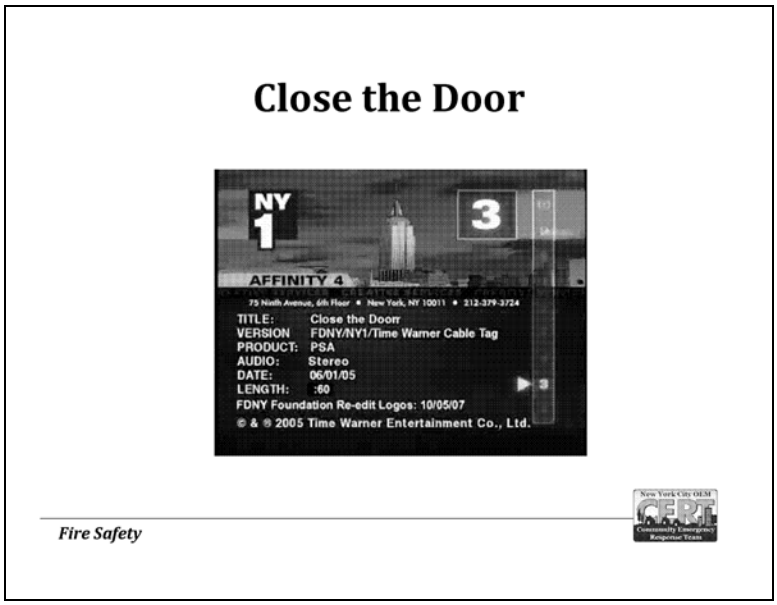


**Key Points**

- By closing the door to the fire area, you are minimizing the spread of the fire and possibly saving lives.
- By minimizing the fire area, you are making extinguishing the fire easier for the FDNY.

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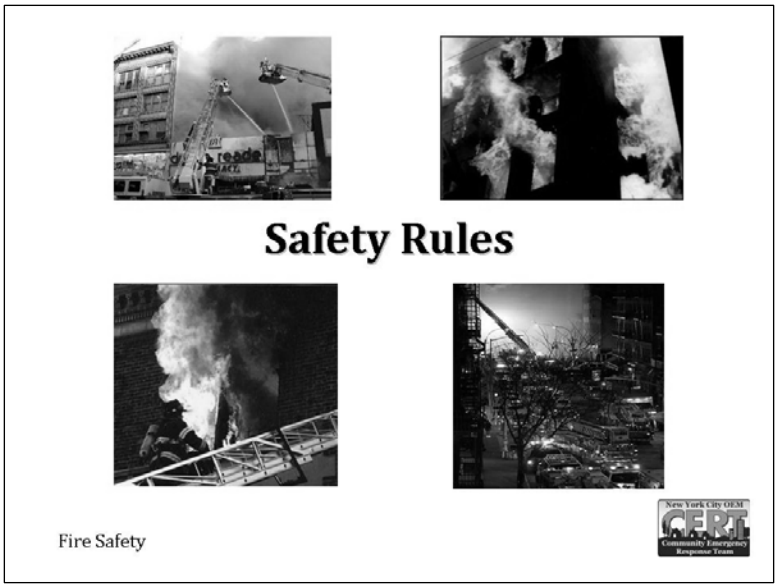


**Key Points**

- Don't forget the CERT number-one priority: SAFETY, SAFETY, and SAFETY - both your personal safety and the overall team safety.
- We must operate as safely as possible because if one of our team members gets injured, we have now become part of the problem.
- We only attempt to extinguish small fires (smaller than a waste basket).
- When extinguishing a fire, place yourself between the fire and your exit.

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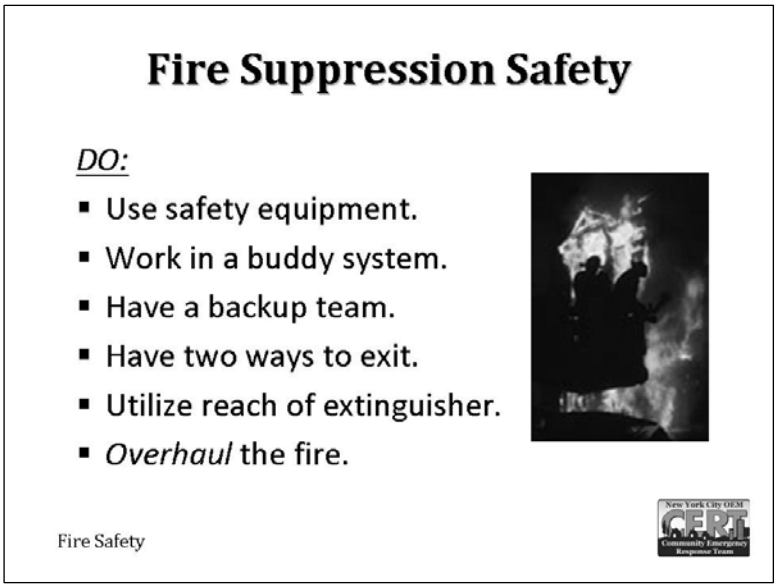


**Key Points**

- Wear all your personal protective equipment. If you cannot adequately protect yourself, close the door to the fire area and get out immediately.
- We always look out for one another using the buddy system. Use both sets of eyes to look for danger and protect one another.
- Don't get too close to the fire. Use the reach of the extinguisher to maintain a safe distance.
- When the fire appears to be extinguished, stir up the ashes to ensure there are no smoldering embers.

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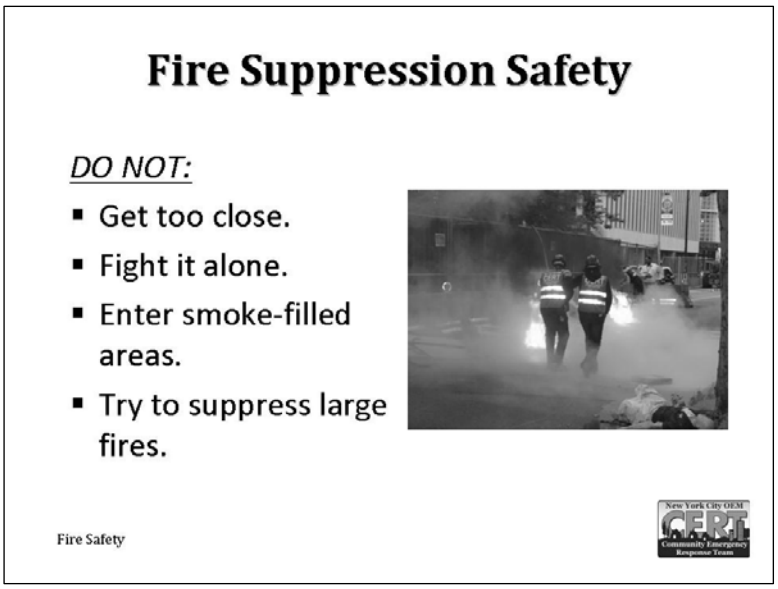


**Key Points**

- If you can feel the heat of the fire, you are too close. Use the reach of the extinguisher to protect yourself by maintaining a safe distance.
- Do not enter a smoke-filled area. NYC CERT members are not equipped with masks to protect them from carbon monoxide (CO) and other toxins found in smoke.
- NYC CERT members are trained to extinguish small fires no bigger than a wastepaper basket.
- Never fight a fire alone. Fighting fires is dangerous and should be undertaken only when using the buddy system.

| Notes: |
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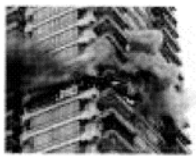
## Universal Considerations

- Be aware of personal *and* team safety.
- Call 911 and relay:
  - Location (address, apt. #, floor, etc.).
  - Victims (if known).
  - Size of fire.
- Follow CERT protocols.
- Reduce panic *and* confusion.
- Be aware of equipment availability.



*Fire Safety*

**Key Points**

- Size-up the hazards of the incident and gather information as safely as possible.
- Call 911 and provide emergency responders with as much information as you can gather.
- Do not act beyond your NYC CERT level of training.
- Be prepared to provide emergency responders with information when they arrive on scene.
- Providing other civilians with information on what to do will ease panic and may protect them from injury.

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**Key Points**

- Install and maintain smoke detectors in your home.
- Install and maintain CO detectors in your home.
- Create and practice a family fire escape plan.

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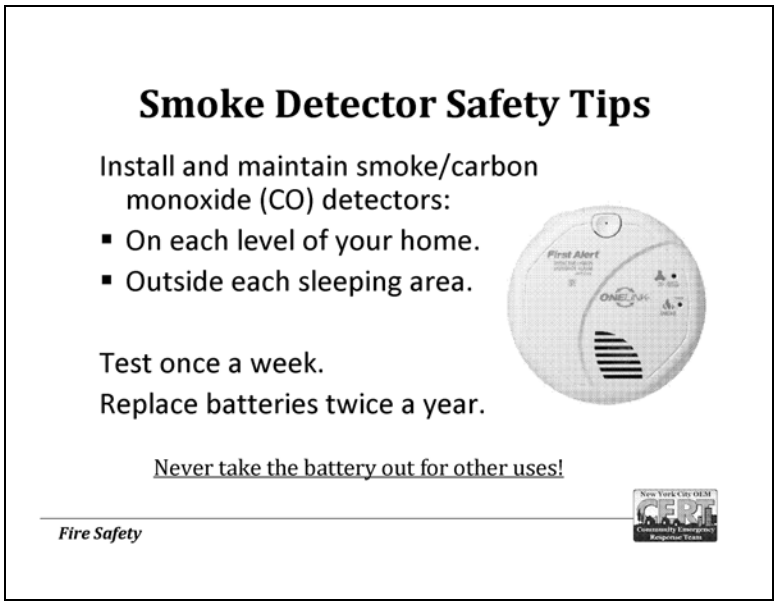


**Key Points**

- Smoke and CO detectors should be installed on each level of your home.
- These detectors should be installed in the vicinity of all sleeping areas.
- Test weekly.
- Ensure that batteries are replaced twice a year – a good time to do this is when we adjust our clocks for Daylight Savings Time in the spring and in the fall ("spring forward, fall back").

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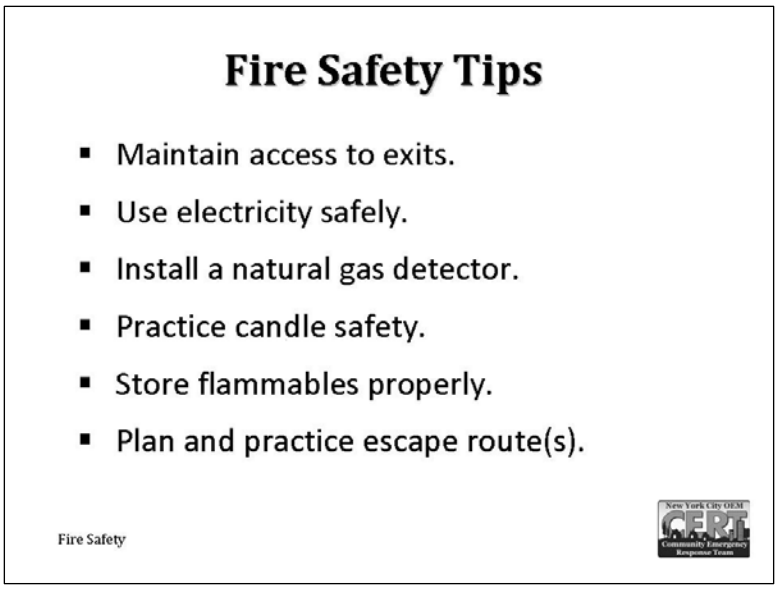


**Key Points**

- Be sure your exits are not cluttered or blocked by furniture, bicycles, or locked gates that require a key to open. If you must have gates on your fire escape window, be sure the lock can be opened ***without*** the use of a key.
- Do not overload electrical circuits. Power strips are not necessarily your friend. They encourage people to plug too many appliances into one receptacle. This is a very serious fire hazard.
- Do not store flammables anywhere they may come in contact with a source of ignition.

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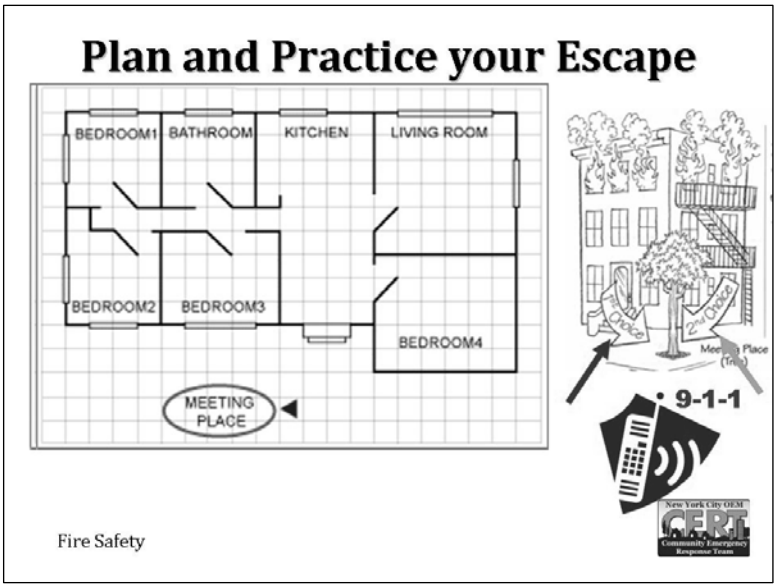


**Key Points**

- Create a fire escape plan and practice it with your family at least twice a year. This can be done when you change the batteries in your smoke and CO detectors.
- Make sure everyone in your family knows two ways to get out of your home.
- Pick a meeting place outside your home. Once you get out, do not go back in.
- If you encounter smoke, use your secondary exit. If both exits have smoke, stay low and crawl below it. The cleanest air will be closest to the floor.

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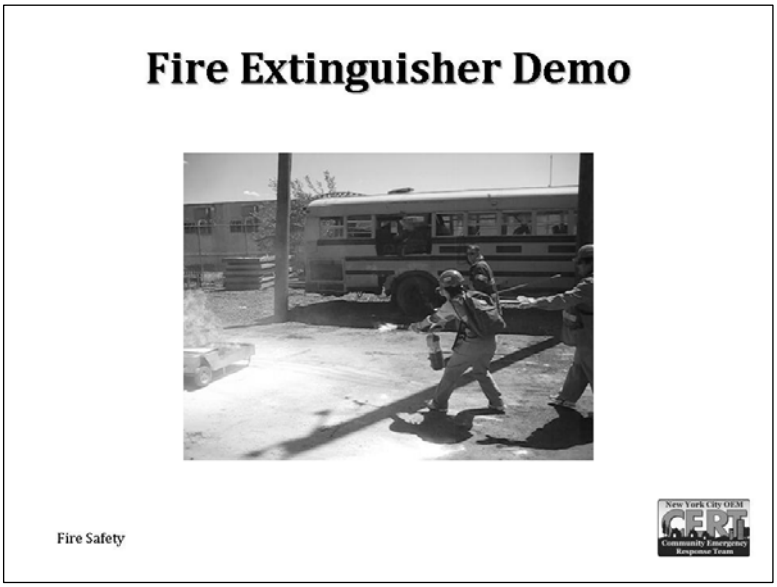


**Key Points**

- In the video demonstration, every point listed must be satisfied during fire suppression.
- These are key reminders for safe operation of a fire extinguisher.

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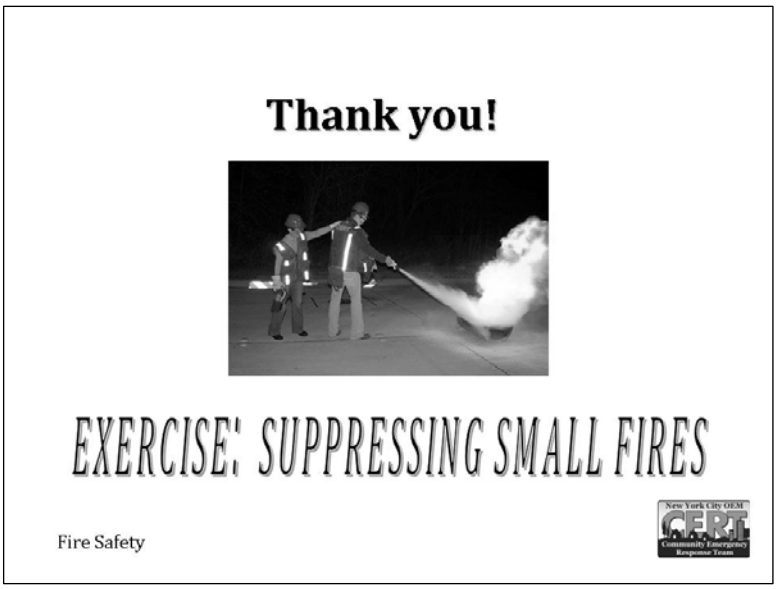


**Key Points**

| Notes: |
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## LESSONS LEARNED

- Learn the chemistry of fire.
- Know how CERT teams can aid in fire prevention in their community.
- Understand CERT's role in fire suppression.
- Learn and practice safe fire extinguishing techniques.

## COMMUNITY AWARENESS

- What lessons were learned in this unit that you might bring to your community?

- What is a message you might stress, learned this week, during a Ready NY presentation?

## PREPARING FOR YOUR FINAL WEEK

Fire safety will be one of the first things you will need to prioritize during the disaster simulation. Remember the safety protocols and how to extinguish using proper techniques.

## EVALUATION

Please fill out the evaluation for Unit 7 in the back of the binder. When completed, please hand in to your OEM Liaison.

## UNIT RESOURCES

NYC FDNY website: www.nyc.gov/fdny

NYC OEM Website: www.nyc.gov/oem

National Fire Protection Administration: www.nfpa.org

# CERT Fire Size up Checklist

| | Yes | No |
|---|---|---|
| **Step 1: Gather Facts** | | |
| *Time* | | |
| ▪ Does the time of day or week impact fire suppression efforts? | ☐ | ☐ |
| How? | | |
| *Weather* | | |
| ▪ Will weather conditions impact your safety? | ☐ | ☐ |
| If yes, how will your safety be affected? | | |
| ▪ Will weather conditions affect the fire situation? | ☐ | ☐ |
| If yes, how will the fire situation be affected? | | |
| *Type Of Construction* | | |
| ▪ What type(s) of structure(s) are involved? | | |
| ▪ What type(s) of construction are involved? | | |

# CERT Fire Size up Checklist

| | Yes | No |
|---|---|---|
| **Step 1: Gather Facts (Continued)** | | |
| *Occupancy* | | |
| ▪ Are the structures occupied? | ☐ | ☐ |
| If yes, how many people are likely to be affected? | | |
| ▪ Are there special considerations (e.g. children, elderly)? | ☐ | ☐ |
| *Hazards* | | |
| ▪ Are hazardous materials involved? | ☐ | ☐ |
| ▪ Are any other types of hazards likely to be involved? | ☐ | ☐ |
| If yes, what other hazards? | | |
| **Step 2: Assess and Communicate the Damage** | | |
| ▪ Take a lap around the building. Is the damage beyond the CERT team's capability? | ☐ | ☐ |
| ▪ Are normal communication channels functioning? | ☐ | ☐ |

# CERT Fire Size up Checklist

| | Yes | No |
|---|---|---|
| ***STEP 3: CONSIDER PROBABILITIES*** | | |
| *Life Hazards* | | |
| ▪ Are there potentially life-threatening hazards? | ☐ | ☐ |
| If yes, what are the hazards? | | |
| *Path of Fire* | | |
| ▪ Does the fire's path jeopardize other areas? | ☐ | ☐ |
| If yes, what other areas may be jeopardized? | | |
| *Additional Damage* | | |
| ▪ Is there a high potential for more disaster activity that will impact personal safety? | ☐ | ☐ |
| If yes, what are the known risks? | | |

## *STEP 4: ASSESS YOUR OWN SITUATION*

- What resources are available with which you can suppress the fire?

- What equipment is available?

# CERT Fire Size up Checklist

| | Yes | No |
|---|---|---|
| ***STEP 5: ESTABLISH PRIORITIES*** | | |
| ▪ Can fire suppression be *safely* attempted by CERT members? | ☐ | ☐ |
| <u>If no, do *not* attempt suppression</u>. | | |
| ▪ Are there other, more pressing needs at the moment? | ☐ | ☐ |
| If yes, list. | | |
| ***STEP 6: MAKE DECISIONS*** | | |
| ▪ Where will deployment of available resources do the most good while maintaining an adequate margin of safety? | | |
| ***STEP 7: DEVELOP A PLAN OF ACTION*** | | |
| ▪ Determine how personnel and other resources should be deployed. | | |

# CERT Fire Size up Checklist

| | Yes | No |
|---|---|---|
| ***STEP 8: TAKE ACTION*** | | |
| ▪ Put the plans into effect. | | |
| ***STEP 9: EVALUATE PROGRESS*** | | |
| ▪ Continually size up the situation to identify changes in the:<br>• Scope of the problem.<br>• Safety risks.<br>• Resource availability. | | |
| ▪ Adjust strategies as required. | | |