

Module 2: Fire Safety

Lesson 2-1: Introduction to Fire Safety

Module Overview

Welcome to Module 2: Fire Safety.

Fires are frequently among the hazards encountered when disaster strikes. Professional firefighters focus on saving lives and putting out major fires, while often contending with obstacles beyond their control, such as impassable roads and violent weather.

As a CERT member, there's a lot you can do to help with fire safety. Some actions that you can take, such as helping with evacuations, directly assist professional firefighters during a disaster. Other actions you can take are equally useful at disaster sites, in your own home, and at your workplace. These include steps such as:

- Recognizing and correcting fire hazards
- Shutting off utilities when necessary to prevent fires
- Putting out small fires

In this module, you'll learn about practices for mitigating fire hazards and the procedures involved in safely putting out small fires.

It should take about **1½ hours** to complete the three lessons in this module:

- Lesson 2-1: Introduction to Fire Safety — **35 minutes**
- Lesson 2-2: Fire Hazards in the Home and Workplace — **30 minutes**
- Lesson 2-3: Safe Fire Suppression — **25 minutes**

After completing this module, you should be able to:

Identify fire safety practices that CERTs must follow

Lesson Overview

Welcome to Lesson 2-1: Introduction to Fire Safety.

In this lesson you'll learn about the role of CERTs in fire safety, the basic principles of fire chemistry, and the different firefighting resources that are available for fighting different classes of fires.

The other lessons in Module 2 will build on this foundation. A good understanding of these fire safety fundamentals is also essential before you take the classroom-based *CERT Basic Training* course in fire safety.

After completing this lesson, you should be able to:

- State the role of CERTs in fire safety
- Correlate fire classification with firefighting resources

It should take you about **35 minutes** to complete this lesson.

Fire Chemistry

What does it take for a fire to burn? Three elements:

- **Fuel**, or material to be burned, which may be a liquid, a solid, or a gas
- **Heat** that raises the temperature of the fuel to its ignition point
- And **oxygen** – Without an atmosphere of at least 20 percent oxygen, most fuels can be heated until they entirely vaporize, without burning.

Together, fuel, heat, and oxygen — called the fire triangle — create a chemical exothermic reaction, or, simply put, fire.

If you take any one of these elements away and permanently interrupt the reaction, the fire goes out. This concept is the basis for fire suppression, as we'll discuss later.

Which one of the three elements do you think is especially important when you have to make decisions about how to extinguish a fire?

exothermic reaction: *A reaction in which heat is given off*

Fuel is especially important when you have to make decisions about how to extinguish a fire. Why? Because the type and amount of fuel determines the fire classification, and that, in turn, tells you which equipment and methods to use to put the fire out.

To explain this, let's begin with how fires are classified.

There are five classes of fire: A, B, C, D, and ...?

Fire Classification

... K is the fifth class of fire. Each class of fire is fed by different types of fuel, as shown in the table below.

Fire	Fuel	Notes
Class A	Ordinary combustibles, such as: <ul style="list-style-type: none">• Paper• Wood• Cloth• Rubber	These fuels leave ash after they burn up.
Class B	<ul style="list-style-type: none">• Flammable liquids, such as oil and gasoline• Combustible liquids, such as charcoal lighter fluid and kerosene	These fuels burn only at the surface because oxygen can't penetrate the depth of the fluid. Only the vapor burns when ignited.
Class C	Electrical equipment, such as wiring and motors	When the electricity is turned off and is no longer feeding the fire, the fire becomes a Class A or B fire, depending on the type of fuel.
Class D	Combustible metals, such as <ul style="list-style-type: none">• Aluminum• Titanium• Zirconium• Magnesium• Potassium	Class D fires are not normally found in residential areas.
Class K	<ul style="list-style-type: none">• Cooking oils (vegetable or animal)• Fats used in cooking appliances	Class K fires are technically flammable liquid/gas fires (Class B), but because of their special characteristics, they are placed in a separate class. Class K can occur in commercial food preparation locations, such as restaurant kitchens, where large quantities of cooking oils are used.

Knowledge Review

During an extremely hot day, gasoline-soaked rags in an unventilated shed catch fire. What classification of fire is this?

- A. Class A
- B. Class B
- C. Class C
- D. Class D
- E. Class K

Answer:

B

Knowledge Review

Accumulated residue of cooking oil ignites in the hood above the commercial range in a restaurant. What classification of fire is this?

- A. Class A
- B. Class B
- C. Class C
- D. Class D
- E. Class K

Answer:

E

Knowledge Review

Electrical power lines felled by a tree are lying across a roof, which catches on fire. What classification of fire is this?

- A. Class A
- B. Class B
- C. Class C
- D. Class D
- E. Class K

Answer:

C

Knowledge Review

A candle on a table ignites nearby draperies. What classification of fire is this?

- A. Class A
- B. Class B
- C. Class C
- D. Class D
- E. Class K

Answer:

A

Knowledge Review

Magnesium supplies in a factory ignite when fire spreads from a wastepaper fire. What classification of fire is this?

- A. Class A
- B. Class B
- C. Class C
- D. Class D
- E. Class K

Answer: D

Firefighting Resources

One important reason for identifying the fire classification is to select the most effective means of suppressing the fire.

Four types of firefighting resources are available:

- Portable fire extinguishers
- Interior wet standpipes
- Confinement
- Creative resources

Portable fire extinguishers are widely used on small fires, and we'll cover them in more detail in a moment.

Interior wet standpipes are usually found in commercial and apartment buildings. These devices:

- Usually consist of 100 feet of 1½-inch jacketed hose with a nozzle tip
- Deliver up to 125 gallons of water per minute
- Should be used by three-person teams (one person to handle the hose, one to bleed air from the line, and one to control water pressure)

Visit the [Fire Equipment Manufacturers' Association Web site](#) to view animations on how interior wet standpipes work.

The other two firefighting resources focus on actions more than on specific equipment or extinguishing agents.

Confinement as a firefighting resource is based on the fact that confining an interior fire by closing doors to rooms and hallways may help restrict the spread of smoke and heat, and it limits the amount of oxygen available to the fire.

As for creative resources, in terms of firefighting this simply means that in certain circumstances you can make use of the resources at hand to fight fires. Examples:

- Swimming pool or spa water and buckets
- Sand or dirt and shovels
- A garden hose

Portable Fire Extinguishers

For the remainder of this lesson, we'll focus on portable fire extinguishers. As a CERT member, you won't be fighting major fires, but you may put out small ones. And that often means using some type of portable fire extinguisher. The parts of the fire extinguisher are:

- Pin: pulled to activate the extinguisher
- Carrying handle and trigger
- Pressure gauge
- Hose or nozzle
- Cylinder: contains the extinguishing agent

The main types of portable fire extinguishers are:

- Water
- Dry chemical
- Wet chemical
- Carbon dioxide
- Specialized

Each type of portable fire extinguisher is used to extinguish specific classes of fire.

What class of fire do you think a water extinguisher is used on?

Water extinguishers are used on Class A fires.

Standard characteristics include:

- Capacity: 2½ gallons
- Range: 30-40 feet
- Pressure: 110 pounds per square inch (psi)
- Appearance: Usually silver

Dry chemical extinguishers rated for Class B and C fires have a sodium bicarbonate base.

Multipurpose dry chemical extinguishers have a monoammonium phosphate base. They are effective for Class A, B, and C fires. Standard characteristics include:

- Capacity: Approximately 10-20 seconds discharge time
- Range: 8-12 feet
- Pressure: 175-250 psi
- Appearance: Usually red

Wet chemical fire extinguishers are used on Class K fires. These extinguishers are charged with an alkaline mixture that reacts with the burning oils to form a foam-like substance that converts the hot cooking oil or fat into soap.

NOTE: Portable Class K fire extinguishers are intended to supplement the automatic fire extinguishing systems that are installed to cut off the fire's fuel source (natural gas or electricity). They should be used as a follow-up after the automatic fire extinguishing system has deployed.

Carbon dioxide (CO₂) extinguishers, while still in use, are becoming less common. CO₂ extinguishers are used on Class B and C fires. Standard characteristics of a CO₂ extinguisher include:

- Capacity: 8-30 seconds
- Range: 3-8 feet

Specialized extinguishers are also less common. An example is the Class D dry powder extinguisher, which uses special agents to remove oxygen from a Class D fire.

Portable Fire Extinguisher Ratings

Portable fire extinguishers must be rated and approved by the State Fire Marshal and by Underwriters Laboratories.

All portable fire extinguishers have two ratings:

- Fire classification rating – indicates the classes of fire on which the extinguisher is effective
- Capacity rating – indicates the size of fire the extinguisher can handle

Capacity Ratings

On labels for Class A and B extinguishers, the capacity rating is expressed as a number. The larger the number, the larger the fire on which the extinguisher may be used.

The capacity ratings vary among the types of extinguishers, as shown in the chart below.

Extinguisher's Fire Classification Ratings	Capacity Rating
Class A	<ul style="list-style-type: none"> • Expressed in gallons, from 1 to 40 • 1 = 1 ¼ gallons, 2 = 2 ½ gallons, 3 = 3 ¾ gallons, etc.
Class B	<ul style="list-style-type: none"> • Expressed in square feet of coverage, from 1 to 640 • 2 = 2 square feet, etc.
Class C	<ul style="list-style-type: none"> • No numerical rating • Includes a list of the metals for which the extinguishing agent is effective
Class D	<ul style="list-style-type: none"> • No numerical rating • Includes a list of the metals for which the extinguishing agent is effective
Class K	<ul style="list-style-type: none"> • No numerical rating

Choosing the Right Fire Extinguisher

Choosing the right extinguisher for the type of fire you need to put out is critical. Using the wrong type of extinguisher is not only ineffective; it could make a bad situation worse. Check the manufacturer's label to make sure the extinguisher can do the job that you need to get done.

The manufacturer's label displays the extinguisher's ratings and properties, including:

- Type of extinguisher (water, dry chemical, CO₂, or specialized)
- Classification rating (which class of fire the extinguisher is effective on):
 - Class A (ordinary combustibles)
 - Class B (flammable and combustible liquids)
 - Class C (electrical equipment)
 - Class D (combustible metals)

- Class K (cooking oil or fat)
- Capacity rating (the size of fire the extinguisher can handle)

The chart below summarizes the types of extinguishers that can be used for each class of fire and the methods that each extinguisher uses to put out the fire.

Fire Type	Extinguisher Type	Extinguishing Method
Ordinary Solid Materials (A)	Water	Removes heat
	Foam	Removes air and heat
	Dry chemical	Breaks chain reaction
Flammable Liquids (B)	Foam	Removes air Breaks chain reaction
	CO ₂	
	Dry chemical	
Electrical Equipment (C)	CO ₂	Removes air
	Dry chemical	Breaks chain reaction
Combustible Materials (D)	Special agents	Usually remove air
Cooking Oil Fires (K)	Alkaline-mixture (potassium-based liquid)	Removes air

Knowledge Review

A manufacturer's label on a portable fire extinguisher is labeled 3A:40B:C. What is the capacity of this fire extinguisher? Select all that apply.

- A. 3 gallons for a Class A fire
- B. 3 $\frac{3}{4}$ gallons for a Class A Fire
- C. 4 $\frac{3}{4}$ gallons for a class B fire
- D. 40 square feet for a Class B fire
- E. 40 square feet for a Class C fire

Answer:
B and D

Knowledge Review

A portable fire extinguisher with a fire classification rating of ABC can be used to extinguish which of the following fires? Select all that apply.

- A. Combustible materials
- B. Electrical equipment
- C. Flammable liquids
- D. Ordinary combustibles

Answer:
B, C, and D

Deciding to Use a Fire Extinguisher

Before attempting to fight any fire with an extinguisher, ask yourself the questions listed on this decision guide.

Can I escape quickly and safely from the area if I attempt to extinguish the fire?

- If the answer is Yes, proceed to the next question.
- If the answer is No, leave immediately!

2. Do I have the right type of extinguisher?

- If the answer is Yes, proceed to the next question.
- If the answer is No, leave immediately!

3. Is the extinguisher large enough for the fire?

- If the answer is Yes, proceed to the next question.
- If the answer is No, leave immediately!

4. Is the area free from other dangers, such as hazardous materials and falling debris?

- If the answer to this question as well as the three preceding ones is Yes, you can attempt to extinguish the fire.
- If the answer is No, leave immediately!

If **ALL** your answers are Yes, you can go ahead and extinguish the fire.

But if **ANY** of your answers are No, do **NOT** try to put out the fire! Instead, leave the building immediately. Shut all doors as you leave to slow the spread of the fire

Decision-Making Scenario

You'll get hands-on practice in using fire suppression techniques when you take the classroom *CERT Basic Training* course.

For now, see if you can apply what you just learned to determine what the classroom CERT members in the following scenario should do.

Ben and Kate are two CERT members assisting in light search and rescue at an office building after a minor earthquake. First, they assess the situation to determine that it's safe to enter the building and to make sure they can quickly and safely exit if necessary. The conditions check out OK, so they enter the building to search for injured survivors.

Inside, in one of the offices, they see a fire in a wastebasket. But before they take any action, they need to consider their own safety.

If they decide to try to put out the fire, are they prepared to escape from the area if anything goes wrong?

- A. Yes
- B. No

Answer:

A

Ben finds a portable fire extinguisher rated for Class A, B, and C fires still securely mounted on the wall near the door of the office. Should he and Kate consider using it to put out the fire?

- A. Yes
- B. No

Answer:

A

Kate checks the label on the extinguisher, which indicates that its capacity is 3-A, 20-B:C. Is the extinguisher large enough for the fire in the wastebasket?

- A. Yes
- B. No

Answer:

A

Ben and Kate quickly scan the area near the wastebasket and see that containers of cleaning products have fallen out of an over-counter cabinet nearby. Several of the containers appear to be damaged, and liquid has spilled out of them onto the floor a few feet from the wastebasket. What should Ben and Kate do next?

- A. Extinguish the fire in the wastebasket, and then clean up the spilled cleaning products
- B. Clean up the spilled cleaning products, and then extinguish the fire in the wastebasket

- C. Call their team leader for backup
- D. Leave the building immediately

Answer:

D

Lesson Summary

In this lesson, you learned about fire safety fundamentals for CERTs.

Key points covered in this lesson include:

- Fire requires heat, fuel, and oxygen. The combination of these elements can cause a chemical exothermic reaction (fire).
- There are five classes of fire, and they are based on the type of fuel that feeds the fire.
- The type and quantity of fuel dictate the best methods and equipment for extinguishing a fire.
- The decision to extinguish a fire should be based on maintaining your personal safety and having access to the proper resources.

You've completed this lesson. You're now ready to begin Lesson 2-2: Fire Hazards in the Home and Workplace.

Be sure to select Course Menu to exit the lesson and receive credit for the course.

Module 2: Fire Safety

Lesson 2-2: Fire Hazards in the Home and Workplace

Lesson Overview

Welcome to Lesson 2-2: Fire Hazards in the Home and Workplace.

In this lesson, you'll learn about common fire hazards that may exist in your home or workplace and actions you can take to minimize these problems.

After completing this lesson, you should be able to:

- Identify potential fire hazards in your home and workplace
- Identify steps you can take to mitigate fire hazards identified in your home and workplace

It should take you about **30 minutes** to complete this lesson.

Fire Prevention

As in other areas of preparedness and response, CERT fire safety begins at home and at the workplace. Locating potential sources of ignition and taking steps to eliminate or reduce potential fire hazards are simple but highly effective ways to reduce the likelihood of fires.

Many potential fire hazards in the home and at the workplace fall into three categories:

- Electrical hazards
- Natural gas hazards
- Flammable liquids

We'll start with electrical hazards.

Electrical Hazards

Creating electrical hazards in your home is all too easy. You can do it unintentionally as you go about the business of a typically hectic day.

Have you ever been running late, rushed out the front door, and forgotten to turn off an electrical appliance, such as a stove, an oven, or a space heater?

Causes of Electrical Hazards

Forgetting to turn off an electric appliance, such as a stove, oven, or space heater, can create a potential hazard in your home.

In addition, many fire hazards in the home and workplace are caused by electrical overloads and faulty electrical appliances. For example, you can create potential hazards if you:

- Overload electrical outlets
- "Daisy-chain" power strips by plugging one into another
- Use adapters to plug three-prong cords into two-prong outlets
- Use extension cords as permanent wiring
- Place electrical cords under carpets or across high-traffic areas
- Use broken or frayed electrical cords

Knowledge Review

Take a moment now to conduct a mental walk-through of your home, room by room. Make a list of the potential hazards you can think of. Write your answers below and compare to the answers given.

Answer:

Typical electrical hazards:

- Overloaded electrical outlet
- Power strip without circuit breaker
- "Daisy-chained" power strips
- Heavy appliance (e.g., refrigerator, space heater) plugged into a power strip
- Use of adapter to plug three-prong cord into two-prong outlet
- Grounding prong removed from three-prong extension cord
- Extension cord used as permanent wiring
- Light-duty extension cord used for heavy-duty purpose (e.g., power tool)
- Electrical cord laid under carpet or across high-traffic area
- Broken or frayed electrical cord
- Malfunctioning electrical appliance
- Appliances left on

You should repeat this activity for your workplace. When time permits, conduct actual room-by-room walk-throughs of your home and workplace and add to the lists as necessary.

Knowledge Review

Look at this list of common practices when using electrical devices. Select Safe or Unsafe for each practice to indicate whether it is or isn't safe.

1. Safe Unsafe Placing an electrical cord beneath a rug
2. Safe Unsafe Using a power tool with a heavy-duty extension cord
3. Safe Unsafe Using a three-prong extension cord as permanent wiring for a piece of electrical equipment
4. Safe Unsafe Using a device with a frayed cord
5. Safe Unsafe Plugging a heavy appliance directly into a three-prong wall outlet
6. Safe Unsafe Plugging one power strip into another

Answer:

1. Unsafe
2. Safe
3. Unsafe
4. Unsafe
5. Safe
6. Unsafe

Mitigating Electrical Hazards

Mitigating electrical hazards involves eliminating potentially dangerous situations. Examples:

- Maintain electrical appliances properly: Repair or replace faulty appliances and replace broken or frayed cords.
- Don't run electrical cords under carpets.
- Don't overload outlets.
- Use extension cords only for temporary purposes.

Meeting Your Electrical Needs

I know I'm overloading power strips, but there just aren't enough outlets for all the equipment I need to use! What am I supposed to do?

If you have too few outlets for your electrical needs, you have at least a couple of options.

One: You can simply use the outlets you do have properly, without overloading them. This may mean that you'll need to take a little extra time to get a job done. Leave an appliance unplugged until it is time to use it, then unplug it when you're finished.

Two: If you have other concerns about wiring, you may need to have an electrician do a safety inspection and recommend improvements.

Responding to an Electrical Emergency

Emergencies sometimes occur despite our best efforts. If an electrical emergency occurs, you may have to shut off electricity at the electrical box.

To be prepared to do this:

- Know where the main fuse or circuit breaker is.
- Label power shutoffs for electrical appliances and different parts of your home so that you can turn off specific items or areas if necessary.

Electrical power to a building includes a main switch (for electricity in all the circuits in the building) and individual switches (for electricity in the individual circuits in the building). If you must shut off power to the building, do so in the proper order.

What do you think you should shut off first, the main switch or the individual switches?

The proper order for shutting off power to a building is to shut off all the individual switches BEFORE you shut off the main switch. Proper shutoff procedures differ for circuit breakers and cartridge fuses.

For circuit breakers:

Step 1: Turn off all the individual breakers first.

Step 2: Shut off the main circuit last.

For cartridge fuses:

Step 1: Unscrew all the fuses first.

Step 2: Pull the main fuse out last

When you are certain that it is safe to turn the power back on, reverse the steps (main power first, then individual circuits).

Never enter a flooded basement to shut off the electrical supply. Water conducts electricity!

Knowledge Review

The Greens are remodeling the family basement so they can use it as a hobby and game room. It will be divided into an area where they can use power tools for woodworking projects; an area where they can use amplifiers, an electric guitar, an electric keyboard, and a computer for playing and composing music; and an area where they can use a sewing machine and do crafts projects. What should the Greens do to make sure the remodeled basement will be free of electrical hazards? Select all that apply.

- A. Identify existing electrical hazards in the basement and take appropriate hazard mitigation measures.
- B. Determine the electrical needs for each of the activities that will be performed in the basement.
- C. Install adapters so they can plug three-prong extension cords into two-prong wall outlets in the woodworking and sewing areas
- D. Have an electrician inspect the basement and recommend improvements for safely meeting their electrical needs

Answer:

A, B, and D

Knowledge Review

Look at this list of practices and circle Safe or Unsafe to indicate whether each practice is or is not safe.

1. Safe Unsafe Plugging a refrigerator into a power strip
2. Safe Unsafe Plugging a computer and printer into a power strip with a circuit breaker
3. Safe Unsafe Connecting a bedside lamp to an outlet behind the dresser using an extension cord
4. Safe Unsafe Turning off electricity by shutting off individual breakers first, and then the main circuit

5. Safe Unsafe Wading through 2 inches of water to the electrical box while wearing rubber boots

Answer:

1. Unsafe
2. Safe
3. Unsafe
4. Safe
5. Unsafe

Natural Gas Hazards

Natural gas is a second category of potential fire hazards.

Natural gas leaking into a home or workplace is hazardous because the gas is:

- An **explosive** substance that can easily be ignited
- An **asphyxiant**, which robs your body of oxygen

What can you do to reduce these hazards?

Mitigating Natural Gas Hazards

You can reduce natural gas hazards if you:

- Install a natural gas detector near your furnace and hot water tank
- Test the detector every month to make sure it works
- Locate and label the gas shutoff valve(s) in your home (There may be multiple gas shutoff valves for appliances inside your house in addition to the main shutoff valve, which is typically located at the gas meter outside the house.)
- Know how to shut off the gas

The procedures for shutting off your home's natural gas are pretty simple ...

Gas Shutoff Procedures

You should know where your gas meter is located. You can close most shutoff valves for gas lines to individual appliances by simply turning the valve lever clockwise (to the right) by hand.

To close the main shutoff valve, you usually need to use a non-sparking shutoff wrench.

- Keep the wrench in a specific place near the main shutoff valve, so you can quickly get to the wrench when you need it.
- Use the wrench to turn the shutoff valve clockwise one-quarter turn.
- When the valve is closed, its lever will be positioned perpendicular to the gas line.

Once you have turned off the gas supply, **leave it off**. Only a trained technician can restore gas service.

Responding to a Natural Gas Emergency

In a disaster, check for signs of a natural gas problem, which may exist if:

- You smell gas
- A natural gas detector indicates the presence of gas
- The indicator on the gas meter shows that gas is still flowing when all gas appliances and heat are turned off

In these situations:

- Do NOT use the phone, light switch, or anything that could ignite the gas.
- Turn off the gas supply at the meter **outside the building**.
- Never enter the basement of a burning structure to turn off any utility.

Knowledge Review

Joe's wife says she smells gas on the deck at the back of the house. Joe joins her on the deck and agrees that he smells gas, too. He then checks the gas meter outside the house. The odor of gas at the meter is stronger than it was on the deck, and the meter shows that gas is flowing. What should Joe do?

- A. Close the main shutoff valve at the gas meter outside of the house
- B. Go inside the house immediately and phone the gas company to report a leak
- C. Spray water on the gas supply piping coming out of the ground below the gas meter
- D. Have his wife close the shutoff valves on the gas appliances inside the house while he closes the main shutoff valve outside the house

Answer:

A

Flammable Liquid Hazards

The third category of potential fire hazards you need to be aware of is flammable liquids. Many common household and office products are flammable or combustible. For simplicity, we'll refer to both flammable and combustible liquids simply as flammable liquids.

Flammable liquids can ignite with explosive force. The vapors — not the liquid itself — can be ignited by any open flame (a match, cigarette, or pilot light), spark, or even static electricity.

flammable: flammable liquids have a flash point below 100°F. They are capable of being easily ignited and of burning quickly

combustible: combustible liquids have a flashpoint at or above 100° F. They are less hazardous than flammable liquids but still pose a risk

Common Flammable Liquid Products

Examples of flammable liquids commonly found in the home and workplace include:

- Gasoline
- Kerosene
- Oil
- Charcoal lighter fluid
- Paint thinners and removers
- Acetone
- Spot removers and cleaning fluids
- Solvents
- Cleaning products

Products packaged as aerosols (e.g., deodorants, hair sprays, insecticides, spray paint) can also pose a hazard if they become heated, because they contain flammable propellants.

Mitigating Flammable Liquid Hazards

To minimize hazards associated with flammable liquid products:

- Read labels to identify flammable products.
- Store flammable products properly in approved safety containers, away from living areas.
- Use flammable liquids in a well-ventilated area.
- In case of fire, use a portable fire extinguisher rated for Class B fires.

Storing Flammable Liquids

Because of their volatility, flammable liquid products require special storage and handling. To ensure safe storage of these products, remember the acronym LIES.

- **L**imit: Limit the amount of flammable liquids in storage.
- **I**solate: Isolate products in approved containers stored in enclosed cabinets. Protect them from ignition sources. Don't store flammable liquids in a mechanical room. Never bring gasoline indoors.
- **E**liminate: Eliminate products that are no longer necessary by disposing of them properly. Reduce fumes by practicing good housekeeping — wipe up spills immediately.
- **S**eparate: Separate incompatible materials (e.g., don't store flammables near corrosives).

Knowledge Review

Which of these people are following safe practices for storing and handling flammable liquids? Select all that apply.

- A. Jake keeps only enough paint thinner on hand for the project he's currently working on.
- B. Bonnie keeps combustible cleaning fluid in a closed cupboard.
- C. Janet stores flammable products in a cabinet that is separate from the one in which she stores corrosives.
- D. Carl stores gasoline in a metal container in the basement of his house.

Answer:

A, B, and C

General Fire Prevention Strategies

Eliminating fire hazards associated with electricity, natural gas, and flammable liquids will go a long way toward reducing fire risks. There are many other ways you can improve fire safety in your home and workplace. Write your answers below and compare to the answers given.

Answer:

- Install smoke alarms.
- Conduct a home (and workplace) hazard hunt.
- Inspect wood stoves and chimneys annually.
- Purchase only space heaters that have been laboratory tested and approved, and follow the manufacturer's directions when using them.
- Keep combustible materials at least 3 feet away from heat sources.
- Keep matches and lighters away from children.
- Never leave fire unattended.

Consult the general fire prevention strategies list for additional detail about each of the strategies.

General Fire Prevention Strategies

Install smoke alarms on every level of your home and near all sleeping areas.

Conduct a home (and workplace) hazard hunt. Many items and conditions around the home and workplace can pose fire hazards. Taking time to look for and eliminate hazards will reduce the risk.

Inspect wood stoves and chimneys annually. Burning wood leaves flammable creosote deposits in the firebox, flue, and chimney. These buildups must be removed professionally to minimize the risk of fire.

Purchase only space heaters that have been laboratory tested and approved. Follow the manufacturer's directions for use. Plug heaters directly into a wall socket, and unplug them when they are not in use.

Keep combustible materials away from heat sources, including stoves, heaters, candles, and fireplaces. Materials such as curtains, bedding, furniture, towels, clothing, bags, and boxes can catch fire quickly. Keep them at least 3 feet away from heat sources.

Keep matches and lighters away from children. Children are fascinated by fire and will play with matches and lighters if they are available.

Never leave fire unattended. A controlled fire can quickly become uncontrolled.

Never leave a candle, fireplace, or space heater unattended.

You should also use this fire hazard mitigation checklist for your home. Then, fill it out, indicating whether you have completed each mitigation step. Bring your completed checklist with you for discussion when you attend the CERT classroom training.

Fire Hazard Mitigation Checklist

Electrical Hazard Mitigation	YES	NO
Eliminate electrical outlet overloads.		
Ensure that all power strips have circuit breakers.		
Avoid using power strips or extension cords in series.		
Plug heavy appliances directly into wall outlets (not power strips)		
Eliminate three-prong/two-prong adapters.		
Replace long-term use of extension cords with permanent wiring.		
Have a heavy-duty extension cord available for power tools.		
Avoid electrical cords under carpets or across high-traffic areas.		
Replace broken or frayed electrical cords.		
Repair or replace faulty electrical appliances.		
Know how and where to shut off electrical power.		
Contact an electrician for electrical improvements (if needed).		
Have a Class C or ABC fire extinguisher available.		
Natural Gas Hazard Mitigation	YES	NO
Install a natural gas monitor.		
Test monitor monthly.		
Know how and where to shut off gas.		
Label gas meter shutoff valves.		
Store shutoff wrench near gas meter.		
Install a natural gas monitor.		
Flammable Liquids Hazard Mitigation	YES	NO
Identify flammable products (read labels).		
Keep flammables in approved safety containers.		
Use flammable liquids only in well-ventilated areas.		
Store flammable liquids in a fireproof cabinet away from living areas.		
Eliminate sources of ignition near flammables.		
Wipe up spills immediately to reduce fumes.		
Separate incompatible materials (flammables and corrosives).		
Have a Class B or ABC fire extinguisher available.		

When you are done with home mitigation, make a list of mitigation tasks that need to be completed at your workplace.

Lesson Summary

In this lesson, you learned about actions that you can take to minimize fire hazards in your home and workplace.

Key points covered in this lesson include:

- A CERT member's fire safety role begins at home and at the workplace.
- Electricity, natural gas, and flammable liquids can create fire hazards.
- Taking the time to look for and eliminate fire hazards reduces the risk of fire in the home or workplace.

You've completed this lesson. You're now ready to begin Lesson 2-3: Safe Fire Suppression.

Module 2: Fire Safety

Lesson 2-3: Safe Fire Suppression

Lesson Overview

Welcome to Lesson 2-3: Safe Fire Suppression.

In this lesson, you'll learn about steps and procedures for safely suppressing fires. Later, when you take the classroom-based *CERT Basic Training* course, you will be trained in how to perform these procedures.

After completing this lesson, you should be able to:

- Identify safe practices for fire suppression
- State the steps of the PASS procedure for fire extinguisher operation

It should take about **25 minutes** to complete this lesson.

Fire Safety Rules

As discussed in the previous lesson, there may be circumstances in which, once you have completed the classroom-based CERT training, you would be able to suppress small fires. However, when carrying out this role, you need to follow some basic guidelines to protect your own safety.

Specifically, there are eight basic rules for safe fire suppression. Let's look at them one by one.

Rule 1: Use personal safety equipment (sometimes called PPE, for "personal protective equipment") to protect yourself.

The basic personal safety equipment that CERT members wear in a disaster includes:

- Gloves
- Goggles
- Dust mask
- Helmet
- Sturdy shoes or boots

Rule 2: Don't try to fight a fire alone.

In a disaster, there is safety in numbers, so be sure that you have help.

- Work with a buddy. Your buddy covers your back, looks around for danger, and protects your safety.
- Have a backup team whenever possible. Having a backup team covering you and your buddy just makes good sense. The backup team can support your fire suppression efforts and can provide help if you need it.

Always keep in mind that your first priority is your personal safety. Don't put yourself at risk!

Rule 3: Check before entering.

This involves doing a sizeup of the situation. Sizeup is a nine-step process of gathering facts and analyzing the situation to determine if it's safe for you to help, and, if so, how you can best be of assistance.

The nine steps in sizeup are:

1. Gather the facts.
2. Assess and communicate the damage.
3. Consider probabilities.
4. Assess your own situation.
5. Establish priorities.
6. Make decisions.
7. Develop plans of action.
8. Take action.
9. Evaluate progress.

The sizeup process applies to many types of CERT operations. You can learn more about it in the classroom-based CERT training.

Sizeup for fire suppression specifically includes the following precautions before you enter an area where there might be a fire:

- Feel closed doors with the back of your hand, working from the bottom of the door up. Do NOT touch the door handle before feeling the door.
- If the door is hot, there is a fire behind it. **Do not enter!** Opening the door will feed additional oxygen to the fire. Trapped fuel vapors can ignite violently.
- Do not enter smoke-filled areas. Fire suppression in smoke-filled areas requires breathing and protective equipment that CERTs don't have.

Rule 4: Plan your exit.

- Always have two ways to exit the fire area. A backup escape plan is necessary in case your main escape route becomes blocked.
- Whenever possible, as you leave the area, shut doors behind you to confine the fire.

Flames spread much faster than you might think. To see how quickly a fire can progress, select the Play button to the right.

Knowledge Review

When checking for survivors in a storm-damaged building, CERT member buddies Greg and Sean encounter a room that has its door slightly ajar and smoke coming out into the hallway. What should they do?

- A. Check the door temperature before entering the room
- B. Enter the room and stay low
- C. Not enter the room and shut the door, if possible, then leave the building
- D. Put on supplied-air respirators before entering the room

Answer: C

Fire Safety Rules

Rule 5: Maintain a safe distance and position in relation to the fire.

- Don't get too close. If you try to put out a small fire, know the effective range of your fire extinguisher. Stay near the outer boundary of that range.
- If you feel the heat before discharging the extinguisher, you're too close. Move up on the fire as it gets smaller to the point of extinguishment.
- Stay low to the ground. Smoke will naturally rise. Keeping low to the ground will provide you with fresher air to breathe.
- Remember: If smoke is filling up a room, confine the fire, if possible, and leave the building.

Knowledge Review

A box of rags has caught on fire in Dan's garage. Fortunately, he has a portable fire extinguisher on hand that is effective on this class of fire. How should he position himself to safely fight the fire? Select all that apply.

- A. He should stand upright and avoid getting low to the ground.
- B. He should position himself near the limit of his extinguisher's effective range.
- C. He should move in just close enough to the fire to feel its heat.
- D. He should move up on the fire as it grows smaller to the point of being extinguished

Answer:
B and D

Fire Safety Rules

Rule 6: Suppress only small fires.

A small fire is about the size of a wastepaper can, and it can be extinguished with one fire extinguisher.

Learn the capability of your equipment (capacity rating of your fire extinguisher). Do not try to suppress a fire that is too large for your equipment.

Rule 7: Use the correct equipment in the correct manner.

First, select the right equipment.

Select a fire extinguisher that:

- Is rated for the class of fire to be extinguished
- Has the capacity for the size of fire to be extinguished
- Is of a size and weight that you can effectively hold and operate

Remember: Types of portable fire extinguishers and their fire classification and capacity ratings are covered in lesson 2-1: Introduction to Fire Safety.

Second, know the proper procedure for operating a portable fire extinguisher.

An easy way to remember the steps of the procedure is to use the acronym PASS, which stands for...

The PASS Procedure

Simply put, the PASS procedure stands for:

- Pull
- Aim
- Squeeze
- Sweep

Step	Action
Pull	First, pull the safety pin in the handle (twist to break the seal).
Aim	Next, test the fire extinguisher to be sure it works and then aim the hose or nozzle at the base of the fire.
Squeeze	Third, squeeze the trigger.
Sweep	Finally, sweep the base of the fire from side to side. Be sure to hold the extinguisher in an upright position as you sweep. Tip: When using a water extinguisher, be careful to avoid scattering lightweight material with the pressurized water, which could spread the fire.

Knowledge Review

CERT members Lauren and Louise have encountered a small combustible metals fire in an industrial process plant that has been damaged by an electrical storm. They are wearing personal safety gear – including helmets, goggles, gloves, and sturdy shoes or boots – and they have a Class ABC portable fire extinguisher at hand. What should they do?

- Use the fire extinguisher that they have, but allow extra distance from the fire for increased safety
- Split up and have one person stay with the fire while the other leaves to get the right equipment to safely suppress it
- Make sure they have two escape routes, and then try to put out the fire with the extinguisher that they have
- Leave the area

Answer:

D

Fire Safety Rules

Rule 8: Overhaul the fire.

Overhauling is the process of locating any potential sources of re-ignition, such as hidden burning material, and extinguishing them. Always overhaul fires to make sure that they're really and truly out before you move on!

CAUTION: Safe fire suppression requires training and practice! You can get hands-on instruction in the how-to's for operating a fire extinguisher properly and putting out small fires safely in the CERT classroom-based training.

There are some special concerns you should be aware of when it comes to suppressing and overhauling Class K fires (cooking oils and fat in commercial kitchens).

Class K fires are particularly difficult to extinguish because they tend to re-ignite. For this reason, only an extinguisher with a Class K rating is recommended for use on this type of fire.

Also, you should first activate the cooking appliance fire suppression system (installed in commercial kitchens) BEFORE using a Class K portable fire extinguisher. Activating the fire suppression system cuts off the fuel source (natural gas or electricity) for the fire and then blankets the hot cooking oil with thick foam produced by the agent contained in the extinguishing system. You should then use the portable extinguisher for follow-up, if needed.

Knowledge Review

Place the following steps for operating a portable fire extinguisher in the correct order, from first to last.

- ___ Test the extinguisher and aim the hose or nozzle at the base of the fire.
- ___ Squeeze the trigger.
- ___ Pull the safety pin.
- ___ Sweep the base of the fire from side to side.

Answer:

2, 3, 1, 4

Knowledge Review

CERT members Marty and Lee encountered a small fire in a home that had been damaged during a storm. They made sure that they had the right equipment for the

job and that it was safe for them to extinguish the fire. Then, using a portable fire extinguisher, they soon extinguished the fire. What should they do next?

- A. Open all doors to let in fresh air
- B. Exit as quickly as possible
- C. Overhaul the fire
- D. Empty the extinguisher's canister

Answer:
C

Lesson Summary

In this lesson, you learned about actions that CERTs can take to suppress fires safely.

Key points covered in this lesson focused on how to protect your safety when suppressing fires.

- Wear protective equipment.
- Work with a buddy and as a team.
- Plan for safe entry and exit.
- Maintain a safe distance and position in relation to the fire.
- Suppress only small fires using the proper equipment.
- Use the PASS procedure to operate fire extinguishers.
- Overhaul the fire to prevent re-ignition.

You've completed this lesson.

CAUTION!!

Although you have completed this lesson on fire suppression, remember that you have not been trained to perform CERT functions. Proper training requires classroom-based instruction and supervised practice.

Do **NOT** try to use the procedures introduced in this lesson until you have completed the *CERT Basic Training* course or other supervised training on the use of fire extinguishers.

For now, let's review what you learned in this module and then see what you can expect to learn in the next module.

Module Summary

In Module 2: Fire Safety, you learned about the fire safety practices that CERTs must follow.

Key points included:

- Fire requires heat, fuel, and oxygen. The combination of these elements can cause a chemical exothermic reaction (fire).
- There are five classes of fire, and they are based on the type of fuel that feeds the fire.
- The type and quantity of fuel dictate the best methods and equipment for extinguishing a fire.
- The decision to extinguish a fire should be based on maintaining your personal safety and having access to the proper resources.
- A CERT member's fire safety role begins at home and at the workplace.
- Electricity, natural gas, and flammable liquids can create fire hazards.
- Taking the time to look for and eliminate fire hazards reduces the risk of having a fire in the home or workplace.
- Wear protective equipment.
- Work with a buddy and as a team.
- Plan for safe entry and exit.
- Maintain a safe distance and position in relation to the fire.
- Suppress only small fires using the proper equipment.
- Use the PASS procedure to operate a fire extinguisher.
- Overhaul the fire to prevent re-ignition.

What's Next?

Now that you've completed this module, you're ready to move on to Module 3: Hazardous Materials and Terrorist Incidents. In that module, you'll learn about practices that CERTs must follow in situations that involve hazardous materials or terrorism. You'll find out how to determine if hazardous materials are present and actions you can take to deal with hazardous materials safely. You'll also learn about what you can do to prepare for and respond to a possible terrorist attack.