1985

4-H 180 Project 1: Fire Safety Education: A Basic Guidebook

Follow this and additional works at: http://digitalcommons.unl.edu/a4hhistory


This Article is brought to you for free and open access by the 4-H Youth Development at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska 4-H Clubs: Historical Materials and Publications by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.
Project 1

Fire Safety Education
A Basic Guidebook

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Leo E. Lucas, Director of Cooperative Extension Service, University of Nebraska, Institute of Agriculture and Natural Resources.

The Cooperative Extension Service provides information and educational programs to all people without regard to race, color, national origin, sex or handicap.
The Guidebook for Fire Safety Education is being reprinted with permission from Pennsylvania State University, College of Agriculture, Extension Service. It was prepared by Dennis J. Murphy, Extension Safety Specialist, and reviewed by William C. Arble, Fire Technologist, Pennsylvania Technical Assistance Program (PENNTAP) and Kathleen A. Butz, Community Resource Development Agent, Venango County.

It is being produced in cooperation with the Nebraska Forest Service, Department of Forestry, Fisheries, and Wildlife, and the Nebraska Fire Service, State Department of Education.

GLOSSARY

COMBUSTIBLE — Any substance or material that will burn.
ELECTRICALLY ENERGIZED — Refers to extension cords, wires, or circuits that have electricity flowing through them. The electrical flow is usually controlled by a switch.
EXTINGUISHMENT — Refers to putting out a fire.
PORTABLE EXTINGUISHERS — A fire extinguisher that weighs less than 40 pounds.
FLAMMABLE LIQUID — Liquids which will burn or explode if exposed to a spark.
PARTICLES OF COMBUSTION — Very small specks given off when materials burn. Some are so small they are invisible without a magnifying glass.
UNDERWRITERS LABORATORY — A nationally recognized testing laboratory that conducts performance tests on materials and products.
FACTORY MUTUAL — A nationally recognized testing laboratory that conducts performance tests on materials and products.
FIRE ESCAPE PLAN — A specific plan of action to escape from fire.
Introduction to the Fire Problem

Fire! It happens thousands of times each day. Right now while you are sitting here reading and learning about fire, a house, a farm, or a public building is on fire. Sometimes the house that catches on fire belongs to someone we know. But usually, the fire happens to somebody we don’t know, and because of this, we are often unconcerned about fires. Fires happen in the future to somebody else. We are more interested in ourselves and now.

In 1985, 22 persons died from fires in Nebraska. Records show that it is young children and older adults who are most likely to die in fires. The young lack judgment and often panic in a fire. Sometimes they will crawl into a closet or hide beneath a bed instead of escaping. Older people often know what to do but are unable to escape. This is why it is so important that the rest of us learn about fires, how to prevent them, and how to help others.

Fire is the type of problem that kills people and destroys property. We must become concerned about fire BEFORE it happens to us. We must all work to prevent fires from happening by learning what causes fires, how to prevent fires, how fires spread, and how fires can be detected. In case a fire does get started, we must know how to put out the fire, how to escape when a fire cannot be put out, and how to telephone for help.

Fire safety is part of being a good citizen. Do your share by learning all you can about fires — and how to prevent them.

DID YOU LEARN

1. Write down in your own words why you think there are so many fires.

2. How many people in Pennsylvania die from fires in an average year?

3. Name the two types of people who are most likely to die in fires?

4. Why do you think the above two types of people are more likely to die from fire than other people?
5. When is the best time to learn about fire?

6. List some ways to prevent fires.

7. Whose responsibility is it to learn about fires?

THINGS TO DO
1. Have members list on a board or piece of paper as many reasons as they can think of why fire safety is a good idea.
2. Invite an insurance person or fire chief to give information on fire problems in the local area.
3. Have someone whose house or barn has been destroyed by fire speak to the group.
How a Fire Burns

UNDERSTANDING FIRE
The first step in understanding how a fire burns is to define the word “fire.” Fire means a visible flame which gives off light and heat.

To burn, a fire must have fuel, air, and heat. All three of these must be present at the same time and in certain amounts for a fire to burn. The three elements of a fire are referred to as the fire triangle.

Fuel. The thing that is burning is called the fuel. Generally, there are three types of fuels: solids, liquids, and gases. An example of a solid fuel is a block of wood, an example of a liquid fuel is gasoline, and an example of a gas fuel is natural gas.

Air. The air we breathe is 21 percent oxygen. If we reduce the oxygen in the air to 6 percent, we cannot live. The same thing happens to a fire. When fire is not supported by more than 6 percent oxygen, it goes out. We refer to this as smothering the fire.

Heat. Heat to start or continue a fire may come from many sources such as matches or other objects already on fire. However, many objects can be heated to the point that they will burn. When this happens, the point at which a substance will start to burn is called its ignition temperature.

Heat Movement. It is important to know how heat moves. There are three basic movements of heat: convection, conduction, and radiation.

Convection is the upward movement of heat. You see this each time smoke from a fire goes up.

Conduction is heat moving through something. A metal spoon which feels hot on one end when the opposite end is held over a flame demonstrates this.

Radiation can be described as the heat you feel from a campfire even though you are not over it or touching any part of the fire.

DID YOU LEARN
Be sure you can answer all the questions before going to the next section.

1. What are the three elements of the fire triangle?

2. List three examples of solid fuels.

3. True or False. As long as the three elements of a fire are together, there will be a fire. Why

4. A match provides which part of the fire triangle?

5. If a frying pan fire is extinguished by putting a cover on it, which part of the fire triangle has been removed?

6. If paper burns until it goes out, what part of the triangle has been removed?

7. List the three ways of heat movement.

8. Chimneys best illustrate what kind of heat movement?

9. If the handle to a pan is too hot to touch, even though the handle is not over the burner, this represents what kind of heat movement?

10. The warmth provided by fireplaces represents what type of heat movement?
THINGS TO DO
Have older members conduct the following activities:

Remove the Air. Light three candles. Then put jars of different sizes over the candles. The candle in the smaller jar goes out first because there is less oxygen available for burning. The candles under the larger jars will extinguish at a slower rate.

Remove the Fuel. Place several crumpled tissues in a deep metal pan or glass dish. Light one small piece of tissue. Using tongs, remove the excess tissue from the path of the flames. When the small piece of tissue is burned, the flames will die.

Remove the Heat. Set fire to a piece of tissue paper in a glass dish or metal pan. Pour water on the burning paper. The water cools the material, takes away the heat, and puts out the fire.

Classes of Fires

DIFFERENT TYPES OF FIRES
Fires are classified by the type of material that is burning. Knowing the type of fire that is burning is critical to putting it out. Using the wrong extinguisher can result in increasing the damage of the fire.

Class A Fires. Class A fires involve things such as wood, paper, cloth, hay, and straw. Class A fires tend to burn deep, smolder, and may eventually rekindle after the flames are put out.

Class B Fires. Class B fires involve gasoline, kerosene, propane, oils, greases, and various types of synthetic products. In putting out this type of fire, care must be taken not to spread the liquid and the fire.

Class C Fires. Class C fires are usually Class A or Class B fires which involve electricity. Included in this classification are fires involving electrical wiring, motors, and other electrical equipment.

DID YOU LEARN
1. How are fires classified?

2. Name the three types of fires.

3. Knowing the type of fire is important because

4. Give five examples of Class A fires.
5. Give two examples of Class B fires.

6. Name two locations in your house where a Class C fire could occur.

7. Give an example of how all three classes of fires could be involved at the same time.

8. Most home fires involve which class of fire?

THINGS TO DO
1. Have a firefighter show the difference between the three classes of fire.
2. Make up a display showing the three classes of fire and put it in a public location.
3. Have members show the classes of fire via a skit or play.
4. Have a contest to see who can come up with the most different burning things within each class of fire.
5. Make up a crosswork puzzle using words that represent the three classes of fire.

An overloaded electrical circuit may result in a Class C fire.
Portable Fire Extinguishers

TYPES OF FIRE EXTINGUISHERS

Fire extinguishers are rated to indicate their effectiveness in extinguishing specific classes and sizes of fire. Labels on the extinguishers show the class of fire and the size of fire the extinguishers can be expected to handle when properly used. The labeling system involves a number and an alphabet letter.

Using a fire extinguisher well requires training and periodic practice. Without training, most people waste most of the contents of the extinguisher and do not get the fire out.

Extinguishers that can handle more than one class of fire will be rated for each class of fire on the label. For example, an extinguisher that is rated 4A:10 BC means that it will extinguish all three classes of fires, if used properly.

The lowest rating for Class A extinguishers is 1A. This would be good in a small area with only a few burning materials. A 2A rating will be twice as effective as a 1A rating, 4A will give four times the protection and so on. Most homes should have an extinguisher with at least a 2A rating. A 2½ gallon pressurized water extinguisher has a 2A rating.

Class B rated fire extinguishers are rated according to the square feet of flammable liquid they will extinguish when used properly. The lowest rating given to a Class B extinguisher is 5B (4B on extinguishers labeled before June 1, 1969). A rating of 10B has twice as much extinguishing agent as an extinguisher with a rating of 5B; a 20B extinguisher will give four times the protection, and so on.

Extinguishers good for Class C fires are not given separate ratings since Class C fires, which are electrical, will usually involve either Class A or B materials. Therefore, if the fire extinguisher is safe to use on Class C fires, the letter C will be listed.

There are several different types of materials used in fire extinguishers. For extinguishers rated only for Class A fires, water is a common agent. But special foams and powdered chemicals can also be used. Foams and chemicals can also be used on Class B and some Class C fires. A gas, carbon dioxide, is also commonly used on Class B and C fires. Water should never be used on a fire involving electrical (Class C) materials, because water conducts electricity and you could be shocked.

The simplest and best way to tell if a fire extinguisher is safe to use on a fire is to read the label. For most home uses, extinguishers approved for all three classes of fires (A, B, and C) would be best.
DID YOU LEARN

1. Match the types of extinguishers with the types of burning materials.

<table>
<thead>
<tr>
<th>Class of Extinguisher</th>
<th>Types of Burning Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>fuse box</td>
</tr>
<tr>
<td>B</td>
<td>mattress</td>
</tr>
<tr>
<td>C</td>
<td>cooking oil</td>
</tr>
</tbody>
</table>

2. True or False. (Circle one) The class of fire is the only thing considered when a fire extinguisher is rated.

3. Circle the one correct answer which identifies the fire extinguisher which will extinguish the greatest area of a flammable liquid fire.

   2A:5BC 2A:10BC 4A 20BC

4. True or False. (Circle one) It takes very little or no training at all to effectively use a portable fire extinguisher.

5. Circle the most correct answer. All / Some / No fire extinguisher(s) can handle more than one class of fire.

6. Fill in the missing blank. A fire extinguisher rated ______ will be appropriate in most homes.

7. Fill in the missing blank. An extinguisher with a rating of 10BC will give ________ the protection of a 5BC rated extinguisher.

8. Circle the best answer. Class C fires:
   a. always involve Class A materials.
   b. always involve Class B materials.
   c. usually also involve either a Class A or Class B fire.
   d. usually occur by themselves and don’t involve another class of fire.

9. Fill in the blank. Using a water extinguisher on a Class C fire may result in ________.

10. Name two extinguishing agents used in Class B and C extinguishers. ________

THINGS TO DO

1. Have members give short talk and/or demonstration on how to use different types of extinguishers.
2. Ask a firefighter for help in setting up a burn pan so that members can practice putting out fires.
3. Have members conduct a survey of their homes and list the rooms or areas where BC extinguishers should be located.

Detecting Fires

EARLY WARNING OF FIRE

Fires generally have three stages. In the first stage, invisible particles of combustion without much smoke or flame are given off. The second stage starts when the products of combustion become visible. These visible products are called smoke. There is still little or no flame or heat being given off. The third stage begins when flames start. As the flames build, more heat may be given off but smoke particles may become less.

A fire can be in the first stage for several hours or even days. Slowly charring wood or charcoal is an example. The second stage can also last for various lengths of time, but is more likely to be from minutes to hours. A smoking mattress would be one example. The third stage, is what we call fire and will last for as long as there is material to burn or until the fire is put out. In most fires, there are two, and sometimes all three stages present at the same time. And, in rapidly developing fires, it may be very difficult to observe the first two stages.

A smoke detector is a thing which senses fires during the second stage. Smoke detectors can be either battery operated or can operate from house current. Either type is effective in detecting fires. It is important that the smoke detector you buy has an Underwriters Laboratory (UL) or Factory Mutual (FM) label. If the smoke detector has one or both of these labels, it means that the detector has been built and tested according to accepted rules.

When a detector senses smoke, an alarm will sound and keep sounding until the smoke is cleared. The alarm is loud enough to wake most people, even with bedroom doors closed.

Good smoke detectors will have test buttons for you to check the detector to make sure that the batteries haven’t died. Most battery-operated detectors will give a low chirping sound if the battery gets weak. Many detectors have a small red light that glows when the detector is working properly.

Installing smoke detectors usually is very simple. Battery-operated detectors mount directly on ceilings and walls. If your smoke detector uses house current, it will have to be near an electrical outlet, or wired into the house wiring system. This should be done by a qualified electrician.

Where you place smoke detectors and how many your house needs varies. The instruction sheet that comes with the detector usually has information on the placement of detectors. Your fire company, county Extension office, or insurance company are other sources of information concerning smoke detector placement.

There are three general rules for detector placement in any home.

1. Detectors should be on ceilings or walls near bedroom areas.
2. Do not put detectors in corners.
3. Locate smoke detectors away from air outlet vents. Proper care of smoke detectors is important to be sure that your family is being properly protected. Replacing bulbs and batteries and cleaning the unit when necessary should be done according to the directions that come with the detector.

**DID YOU LEARN**

1. Match the stages of fire with the descriptions of the stages.
   
   a. 1st stage ________________________
   b. 2nd stage ________________________
   c. 3rd stage ________________________

   products of combustion seen
   much heat given off
   could last for days

2. A smoke detector senses fire in which stage of fire? ____________________________

3. True or False. (Circle one) All fires involve all three stages of fire.

4. Name the two methods by which smoke detectors are powered.

   ____________________________

5. What does an Underwriter Laboratory (UL) or Factory Mutual (FM) label show? ____________________________

6. When a smoke detector senses smoke, what does it do? ____________________________

7. List some features of a good smoke detector. ____________________________
8. True or False. (Circle one) The placing of smoke detectors is very difficult and requires the skill of a contractor.

9. True or False. (Circle one) Detector placement should be the same in all homes.

10. List as many sources or places you can contact for help in finding where you should place smoke detectors in your home. ________________________________________________________________________________ _

11. Why should you not put smoke detectors in the corners of rooms?

12. Name the best source of smoke detector care information.

THINGS TO DO
1. Have members discuss smoke detectors.
2. Invite somebody to demonstrate smoke detectors.
3. Have members survey their homes. How many already have detectors? Where are they placed?

Fire Escape Planning

ESCAPING FROM FIRE
Many persons, especially young children, die in home fires because they make mistakes when trying to get out of a burning house. The main reasons these mistakes are made are because families have neither prepared nor practiced fire escape plans. People who have an escape plan and have practiced it are much less likely to panic and have a much better chance of surviving fires.

The fact that fatal home fires most often occur between the hours of midnight and 6:00 a.m. adds to fire escape problems. The homes electrical system may have been burned out and many people are just a bit groggy when aroused from their sleep. Stumbling around in the dark or hesitating just a few minutes while you try to get yourself awake may mean you will never get out.

The first thing to do when fire is discovered is to make sure others are getting up and out. Make sure everyone is getting out before worrying about telephoning the fire department. Lives are more important than property.

There are several things you should remember to help you escape a fire during the night. One of these is to keep your bedroom door closed so that smoke and poisonous gases cannot get into your room while you’re asleep. By keeping doors closed at night, smoke will build up faster and set off your smoke detector quicker. You should never pull open your bedroom door quickly without first feeling the door to see if it is hot. If it is hot, that means the fire and smoke are likely to be near the door, and you should leave the door shut and use another way out.

An alternative escape route means getting out a different way than you normally would. For example, the fastest and easiest way to get out of the house from upstairs is by going down the stairway. The alternate route might be through your bedroom window to the garage roof to the ground.

If you do have to go through smoke to get out, remember to bend low and to cover your mouth.

If you have to go through a bedroom window to escape the fire, can you open the window? Will a ladder be necessary because of the height of the window? Is there an object in your room that could be used to break a window if necessary? Do you know how to protect yourself from the broken glass as you climb through the window? You should be able to answer these questions and more.

Once everyone has escaped, it is important for every member of the family to meet in one spot. This lets everyone in the family know that all persons have escaped. Parents and firefighters have been killed because they went back into a burning house looking for a young person who was already out.
DID YOU LEARN

1. After you have made a fire escape plan, the next step is to

2. Preparation of an escape plan is likely to reduce ________________
and increase ________________ is the first thing to do when a fire is discovered.

3. ________________

4. Lives are more important than ________________

5. Place a check in front of the best answer to the following question.
   It is best to keep your bedroom door:
   ___ open at night to hear the smoke detector.
   ___ closed at night to keep smoke and gases out.
   ___ cracked open just a little to keep most of the smoke out and let the noise of the smoke detector through.

6. If the door or doorknob to your bedroom is hot, what does it mean?

7. What should you do if you have to pass through smoke when escaping from a fire?

THINGS TO DO

1. Make a map of your house (see map) to show how your family would escape a home fire in the middle of the night. If bedrooms are on more than one level of the house, make two drawings.

2. Answer the following questions using your own house.
   a. How many windows are there for you to use during an emergency?
   b. Can you open the window(s)?
   c. How far is it down to the ground from your window(s)?
   d. If more than 6 feet, do you keep a ladder or rope in your room?
   e. If you would have to break a window, list three things (in order of preference) that you would use.

3. Lead your family in a fire escape drill.