Senior High School

DepED
DEPARTMENT OF EDUCATION

Disaster Readiness and Risk Reduction

Quarter 2 – Module 4
Fire Hazards

ALTERNATIVE DELIVERY MODE
ADM

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Alternative Delivery Mode
Quarter 2 – Module 4: Fire Hazards
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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

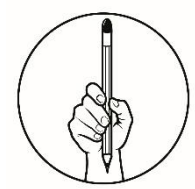
What I Need to Know

This module was designed and written with you in mind. It is here to help you master the Fire Hazards. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module is all about Fire Hazards.

After going through this module, you are expected to:

1. recognize elements of the fire triangle in different situations;
2. analyze the different causes of fires; and
3. observe precautionary measures and proper procedures in addressing a fire incident.



What I Know

Directions: Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of the following measures remove the heating element in an occurrence of fire?
   A. Cover the fire with a damp cloth.
   B. Remove nearby flammable liquids
   C. Tackle the fire with a fire extinguisher.
   D. Wear a protective mask to avoid inhaling toxic fumes.

2. Which of the following is most likely to be a hazard during a fire?
   A. water
   B. smoke
   C. fire alarm
   D. temperature

3. Which element/s would be needed for a fire to ignite?
   A. fuel
   B. oxygen
   C. heat
   D. All of the above.

4. Which is the BEST thing to do when caught in a fire that is too large to fight?
   A. Run for your life.
   B. Press the fire alarm and call the fire department.
   C. Open the windows to drive the smoke out.
   D. Ensure that everyone vacates the room.

5. What does fire require to burn?
   A. flame
   B. fuel
   C. nitrogen
   D. smoke

6. Which of the following practices is NOT advised when you are cooking?
   A. Unplug cooking appliances after use.
   B. Keep flammable things away from the stovetop.
   C. Carry the burning pot or pan to a different room.
   D. All of the above.

7. How can spontaneous combustion be prevented from occurring?
   A. Keep leaf piles, sawdust and other flammable materials outdoors.
   B. Store flammable materials in a cool and dry place.
   C. Wash oily rags before storing them.
   D. All of the above.

8. Why are candles considered a fire hazard?
   A. They ignite flammable things.
   B. The smell makes people dizzy.
   C. Hot wax will ignite things that it touches.
   D. All of the above.

9. Which of the following shows a proper practice in using electrical devices?
   A. The cord should be hung up when not in use.
   B. Avoid using faulty electrical equipment.
   C. Keep heating equipment at a good distance from each other.
   D. All of the above.

10. What does PASS in fire extinguishers mean?
   A. peel, aim, sweep, shoot
   B. pull, aim, squeeze, sweep
   C. plunge, aim, shoot, sweep
   D. press, aim, squeeze, sweep

11. What element of the fire triangle is removed when water is sprayed to an open flame?
   A. fire
   B. fuel
   C. heat
   D. oxygen

12. What element of the fire triangle is removed when a wet blanket used to put out a fire?
   A. fire
   B. fuel
   C. heat
   D. oxygen

13. How should combustible materials be stored?
   A. Label all materials.
   B. Wipe any spilled substance.
   C. Keep them in a cool and dry place.
   D. All of the above.

14. Which of the following practices would prevent a fire?
   A. Store flammable materials properly.
   B. Unplug appliances when not in use.
   C. Regularly check electrical systems and machines.
   D. All of the above.

15. Which of the following practices would counteract a fire?
   A. Keep matches away from children.
   B. Turn off the stove before leaving it.
   C. Always check the LPG tank for leaks.
   D. All of the above.

Lesson 1 Fire Hazards

March is one of the hottest months of the year in the Philippines. According to the Bureau of Fire Protection, this is also the time when the highest number of fire incidents are reported. Fire brings about the destruction of buildings and the loss of livelihood and lives. It mainly occurs because of negligence and lack of awareness of the different fire hazards. Hence, to reduce the dangers caused by fire, the month of March is declared as the Fire Prevention Month in the country. During this month the campaign for fire prevention is intensified.

What's In

In the last module, you learned about hydrometeorological hazards. What signs indicate an impending typhoon, thunderstorm, or flash flood? What information can a hydrometeorological hazard map provide? Can you enumerate some tools used in monitoring hydrometeorological hazards?

Like typhoons and thunderstorms, fire is a common hazard that could turn into a disaster. A simple ignition can spread easily and devastate a home and community.

Notes to the Teacher

Encourage students to be responsible members of their community and the society. Remind them that disaster prevention will be more effective if everyone will take part in it.

What's New

Activity 1. Theme park on fire

Directions: Have you ever been to Star City or any other theme park? Study the picture below and answer the questions that follow.

Figure 1. Star City on fire

Source: https://news.abs-cbn.com/news/10/06/19/star-city-deliberately-set-on-fire-says-authorities

Guide questions:

1. Enumerate the possible reasons that could have caused the fire.
   _____
   _____
   _____
2. If you were part of the management team, what could have been done to prevent the accident?
   _____
   _____
   _____

What is It

Fire

Fire is the rapid oxidation of a flammable material accompanied by the production of light and heat**.** The discovery of fire has brought significant advancements to people and industries. Aside from being used as an external source

of heat and light, it is also used as a power source. Natural fires of low intensity may benefit the environment and restore ecological balance through the removal of pests and plants that compete with other species for nutrients.

Elements of Fire and stages of fire development

Fire is composed of three elements, namely heat, fuel, and oxygen. These three elements form the fire triangle as seen in Figure 2. A fire starts when fuel is heated from an external source and reaches its ignition temperature. Oxygen reacts with the fuel to sustain the fire. Once fire has started, it will continue to burn until an element of the fire triangle is removed.

Figure 2. Fire triangle
Source: https://en.wikipedia.org/wiki/Fire_triangle

Figure 3 shows the four stages of fire development. It is during the **incipient stage** where ignition occurs. The fire has just started and has not yet affected a large area. It may produce a small flame and some smoke but the heat of the fire produced is still low. It would be best to extinguish the fire at this stage while it is still small.

Figure 3: Stages of Fire Development
Source: https://firefightergarage.com/wp-content/uploads/2020/04/stages-of-fire.jpg

The fire reaches the **growth stage** when it can continue burning by itself as it uses its own heat to burn fuel sources around it. Smoke is already visible and may start accumulating. The temperature of the affected area will start to increase and the fire will continuously grow bigger as it burns more fuel. When the fire reaches its hottest point, it is now in the **fully developed stage**. During this stage, firefighters will likely extinguish the fire from a distance as it is dangerous to go near or enter the vicinity. When the fire runs out of fuel to burn or it runs out of oxygen, it now enters the **decay stage**. In this stage, no fuel must be added as it will cause the fire to reignite.

Causes of fires

Many fires start due to negligence such as leaving the stove unattended or by not organizing the storage cabinet. The things that we find useful in our homes such as paper, paint, cooking oil, and electrical appliances can ignite and burn easily. The following are common causes of fire:

1. Faulty electrical wiring or connection
2. LPG-related
3. Neglected cooking or stove
4. Lighted cigarette butts
5. Left unattended open flame: torch or sulo
6. Left unattended open flame: candle or gasera
7. Matchstick or lighter kept near flammable materials
8. Direct flame contact or static electricity
9. Neglected electrical appliances or devices
10. Unchecked electrical types of machinery
11. Flammable chemicals
12. Incendiary device or ignited flammable liquid
13. Spontaneous combustion
14. Under planned pyrotechnics
15. Bomb explosion
16. Lightning
17. Others (forest fire, vehicular fire, etc.

Flammable materials could also ignite on their own in an event referred to as **spontaneous combustion.** This happens when an object produces its own heat without absorbing heat from its surroundings. When it reaches a temperature enough for ignition, it will start a fire by itself. Everyone should be mindful of materials that are prone to spontaneous combustion such as spilled oil, oily rags, paper, dried leaves or hay. It is better to store them in well-ventilated areas or outdoors to prevent ignition and to easily dissipate the heat.

Precautionary and safety measures

Uncontrolled fires, whether natural or man-made, may lead to injury, death, loss of livelihood, and damage to property with its toxic fumes and high temperature. A person may die of asphyxiation as fire consumes oxygen and the concentration of carbon monoxide and other toxic gases increase. Furthermore, the heat from a hostile fire is far from any temperature that a person is normally exposed to. This can cause extreme pain, severe burns, and other casualties. Fire may result in black and impenetrable smoke that may sting the eyes and block one's vision. Once a person is caught in a fire, it would be difficult, if not impossible to escape the area. With this, people must participate in fire drills to be knowledgeable of the fire escape plans. Buildings and infrastructures should have a well-planned evacuation plan showing multiple escape routes to increase the chances of survival during a fire. Moreover, one should be aware of the precautionary and safety measures for fire. These include the following:

1. **Never leave a fire unattended.** Whether it is a stovetop, a candle, or a bonfire, it is never safe to leave an open flame. If you need to leave, make sure to put the fire out.

2. **Always check the electrical equipment.** A faulty appliance or electrical cord can easily malfunction and ignite. Similarly, an overloaded electrical socket or extension cords can heat up and ignite due to the overuse of electricity. Electrical wiring should be regularly checked to make sure there is nothing wrong with the system.

3. **Keep a good distance between things that can catch fire.** Declutter the area and make sure that anything that can cause ignition and serve as fuel is distant from each other.

4. **Educate children and adults about fire safety.** Curious children may accidentally set anything on fire. It is best to keep flammable materials stored in areas that are out of reach for them. Teach them about the dangers of fire and how it can be prevented.

5. **Store flammable materials properly.** When fuels are exposed to ignition, they will easily catch and spread the fire. Always label them and keep them from any heat source. Be careful when using them. Wipeout any spills in the working space as they can easily be forgotten and may cause a fire. Make sure there are no sources of ignition around the area.

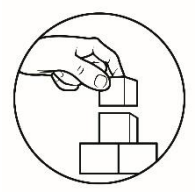
6. **Keep a fire extinguisher of a bucket of sand handy.** Before using any flammable material, be prepared with materials that can put out the fire in case it occurs. Have a wet cloth, a source of water, or a fire extinguisher in strategic places that everyone knows and is easy to reach. Learn how to use a fire extinguisher. Pull the pin located at the handle then aim its nozzle at the base of the fire. Slowly squeeze the lever while sweeping it from side to side. The PASS acronym for using fire extinguishers means to pull, aim, squeeze, and sweep.

7. **Install fire alarms and smoke detectors.** These instruments alert everyone and signal them to escape when they can and before the fire becomes bigger.

8. **Know what to do in case of fire.** Participate in fire drills. Be aware of the exit points of your house, school, or workplace. Educate yourself and the people around you about what to do in case a fire breaks out.

9. **Develop a fire preparedness plan.** A fire preparedness plan is a floorplan containing the possible sources of fire and a guide on what a person can do in the event of a fire incident. It gives us an idea of how one can save himself in case of a fire in their homes, workplace, and in school. It presents the location of the fire exits that people can pass through to immediately evacuate the area. It should also show the location of fire assembly points, designated safe areas where people can go in case of a fire.

The key to preventing fires from occurring is to make sure that the elements of the fire triangle do not come together. Prevent ignition by making sure that flammable materials do not heat up and reach the ignition temperature. Fuel sources should be kept away from ignition sources. In case a fire breaks out, smother it to eliminate the source of oxygen.



What's More

Activity 2. Recognizing fire elements

Directions: In each given situation, identify the elements of a fire triangle. Answer the questions that follow. A sample is done for you.

Situation	**Heat**	**Fuel**	**Oxygen**
A candle left unattended in the bedroom	*Lighted candle*	*Bedsheets, curtain*	*The air in the room*
Situation	**Heat**	**Fuel**	**Oxygen**
Smoking a cigarette in the bedroom			
Unattended cooking			
Forest wildfire			

Answer the question:

What is the relevance of recognizing the different elements of the fire triangle in each situation?

_____

_____

_____

Activity 3. Fire hazards everywhere!

Directions: Analyze the images below and identify the sources of ignition and fuel. Explain how these may start a fire.

Adapted from: http://www.peersrooneytraining.co.uk/v-content/uploads/2012/06/level-2-fire-safety-activity-sheets.pdf

1.

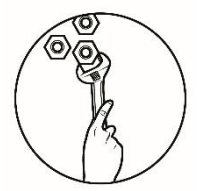
Fuel	How it may start a fire	Source of ignition	How it may start a fire

2.

Fuel	How it may start a fire	Source of ignition	How it may start a fire

What I Have Learned

1. What are the elements that make up the fire triangle?
2. How do these three elements cause a fire?
3. Enumerate 3 causes of fire.
4. Enumerate 3 precautionary measures that can prevent fire.



What I Can Do

Fires involving personal electronic devices are rampant nowadays. As a student how are you going to address this issue and the possible risks that may happen in the community?

Directions: Go to any room in your house. List down the possible things that may start a fire, explain how that could happen and what should be done to prevent it.

Room: _____

Item/Scenario	Why it can cause fire	Precautionary measure

Assessment

Directions: Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which best describes the fire assembly point?
   A. where the fire extinguishers are stored
   B. an area that has a high risk for fires to occur
   C. an area where you may assemble in the event of a fire
   D. an area you are required to avoid in the event of a fire

2. Which of the following is the best thing to do when you see a fire on the worksite?
   A. sound the fire alarm
   B. try to put the fire out
   C. tell an adult or your superior
   D. grab your tools and quickly exit the area

3. What element of the fire triangle is played by the wooden sticks in a bonfire?
   A. fire
   B. fuel
   C. heat
   D. oxygen

4. What element of the fire triangle is played by the wax of a burning candle?
   A. fire
   B. fuel
   C. heat
   D. oxygen

5. Which of the following are statements show fire prevention?
   A. Practice fire drills.
   B. Conduct fire rescue training.
   C. Separate the fuel sources from ignition sources.
   D. None of the above.

6. Where should matches be stored?
   A. bedroom
   B. drawer beside the stove
   C. hanging cupboard
   D. tabletop

7. Which of the following should NOT be done when cooking?
   A. Use a small pan.
   B. Use many pans at once.
   C. Leave the pan with a lid.
   D. Leave the stove unattended.

8. What is the importance of a fire alarm?
   A. It prevents fire from spreading.
   B. It prevents fires from occurring.
   C. It alerts everyone of the ongoing fire.
   D. All of the above.

9. Barbecue picnics cause big fires even when done outdoors. What should be done to prevent this?
   A. Spray water over the burning charcoal.
   B. Let the burning charcoal lose heat in the trashcan.
   C. Leave the burning charcoal in the grill until it loses heat.
   D. None of the above.

10. You noticed that an extension cord is plugged in both slots of the power outlet and several appliances are also plugged in it. What should you do?
   A. Tell an adult about it.
   B. Organize the cords as they look cluttered.
   C. Remove some appliances and one extension cord from the outlet.
   D. None of the above.

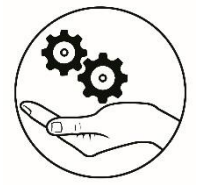
11. Which element/s would be needed for a fire to start?
   A. fuel
   B. heat
   C. oxygen
   D. All of the above.

12. Which element/s would be needed for a fire to continue burning?
   A. fuel
   B. heat
   C. oxygen
   D. All of the above.

13. Which of the following should be done when you see a child playing with matches?
   A. Get the matches and keep them.
   B. Remove other flammable materials in the room.
   C. Explain that playing with matches is dangerous.
   D. All of the above

14. You noticed that the appliances and light bulbs at your house flicker often. Which of the following is the best thing to do about this?
    A. Check for overloaded power outlets.
    B. Reduce the appliances used at the same time.
    C. Have your electrical wirings be checked by an electrician.
    D. All of the above.

15. How can you prevent fuels from starting a fire?
    A. Keep them covered.
    B. Label them properly.
    C. Keep them in a cool and dry place.
    D. All of the above.



Additional Activities

Directions: Fire safety should always start with you and your family members. Make a list of the practices that you observed at home that may cause fire then list down the precautionary measures that your family should practice.

What we do	What we should do

Answer Key

What I Know	What's New	Assessment
1. A/C 2. B 3. D 4. A 5. B 6. C 7. D 8. A 9. D 10. B 11. C 12. D 13. D 14. D 15. D	**Activity 1** 1. Answers may vary. Electrical problem 1. Answers may vary. Regular maintenance of the theme park rides, proper information dissemination among employees and visitors **What's More** **Activity 2** 1. Heat- lighted cigarette; Fuel-Blankets, pillows; Oxygen- air in the room 2. Heat-fire from the stove; fuel-cooking oil, LPG; Oxygen-air in the kitchen/room 3. Heat-sun; fuel-dried leaves/grass; oxygen- air in the surroundings, wind Recognizing the different fire elements in each fire situation is necessary so one can pinpoint what he/she can eliminate to stop the fire from causing more destruction. Answers may vary. The observation of the changes in the surroundings would help to prevent or lessen the negative effects of hydrometeorological disasters. **Activity 3** 1. Fuel sources – cooking oil, LPG, How it may start a fire- spills near the stove, unchecked LPG hose Source of ignition- gas stove, matches, electrical sockets How it may start a fire- unattended cooking, cluttered workspace, overloaded electrical sockets 2. Fuel sources – gasoline cans, oil, grease spills on the floor, unlabeled fuel cans/containers How it may start a fire- spills may accidentally be in contact with fire Source of ignition- electrical tools and equipment, cigarette How it may start a fire- unattended cooking, throwing of lighted cigarettes on the floor, overloaded electrical sockets, chemical reaction of unlabeled substances. **What I Have Learned** 1. The fire triangle is composed of heat, fuel and oxygen. 2. Heat is needed to raise the temperature of a material to ignition temperature. A fire needs a fuel source in order to burn. A fire needs oxygen to start and continue. 3. Answers may vary. Fire may be caused by leaving open flames unattended, overloading electrical sockets or improper storage of flammable materials. 4. Answers may vary. Some safety measures include: never leave a fire unattended, always check electrical equipment and keep a good distance between things that can catch fire.	1. C 2. A 3. B 4. B 5. C 6. C 7. D 8. C 9. A 10. C 11. D 12. D 13. D 14. D 15. D

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