Firefighting II

8706 36 weeks / 140 hours

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Acknowledgments

The components of this instructional framework were developed by the following panelists:

Brandon Bullock, Fire Lieutenant, Richmond Department of Fire and Emergency Services
James Jones, Chief, Dale City Volunteer Fire Department
Michael King, Former Training Officer/Instructor, Navy Region Mid-Atlantic Fire and Emergency
Course Description

Suggested Grade Level: 11 or 12
Prerequisites: 8705

This course builds on the professional knowledge and skills gained in Firefighting I. Students respond to situations caused by simulated terrorism, accidents, and natural disasters by managing resources such as medivac helicopters, emergency medical personnel, technical rescue teams, and community-based organizations. Students will become familiar with the procedures, equipment, and technologies used by current fire departments. This course challenges students academically, mentally, and physically and meets the standards of National Fire Protection Association (NFPA) leading to the opportunity to obtain Firefighter II certification.
Note: Students must be at least 16 years old (40-1.79.1 Code of Virginia) by the first day of the course offering. Enrollment also requires parental consent. Additional requirements, including CPR and HAZMAT operations, are stipulated for students seeking NFPA Firefighter I or II certification.

As noted in Superintendent's Memo #058-17 (2-28-2017), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.

Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (◯) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

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<td><strong>Analyzing Construction Materials and Building Collapse</strong></td>
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<td>Identify the effects of fire and fire-suppression activities on structures.</td>
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<td>List the actions to take when imminent building collapse is suspected.</td>
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<td><strong>Working with Rescue and Extrication Tools</strong></td>
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<td>44 ⊕</td>
<td>Demonstrate the use, care, and maintenance of power plants, lighting equipment, and auxiliary electrical equipment.</td>
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<td>Identify rescue and extrication tools and equipment.</td>
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<td>List safety guidelines for rescue and extrication tools.</td>
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<td>Select tools for specific rescue and extrication situations.</td>
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<td>Demonstrate rescue and extrication methods, using various equipment.</td>
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<td>Extricate a victim from a vehicle.</td>
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<td>List types of building collapses and hazards associated with rescue operations.</td>
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<td>Describe rescues and recoveries in specific environments.</td>
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<td><strong>Managing Hydrant Flow and Operability</strong></td>
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<td>53 ⊕</td>
<td>Identify water flow and pressure terminology.</td>
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<td>Record hydrant flow pressures.</td>
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<td>Demonstrate the use of valves, valve devices, hose-fitting appliances, and tools used with hoses.</td>
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<td>Test hose function.</td>
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<td><strong>Managing Foam Fire Streams</strong></td>
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<td>List procedural steps and terms associated with using foam and related equipment.</td>
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<td>List the characteristics of foam and foam production.</td>
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<td>59 ⊕</td>
<td>Demonstrate the use and application of foam in various fire situations.</td>
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<td><strong>Controlling Ignitable Liquid and Flammable Gas Fires</strong></td>
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<td>Compare the characteristics of flammable liquids to combustible liquids.</td>
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<td>Demonstrate methods used to suppress Class B fires.</td>
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<td>Describe the signs and effects of boiling, liquid, expanding, vapor, explosion (BLEVE).</td>
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<td>Demonstrate methods for suppressing bulk-transport vehicle fires.</td>
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<td><strong>Examining Fire Detection, Alarm, and Suppression Systems</strong></td>
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<td>Identify types of initiating devices and their components.</td>
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<td>Identify types of automatic alarm systems.</td>
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<td>Identify sprinkler system applications and components.</td>
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<td>67</td>
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<td>Inspect sprinkler systems.</td>
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<td>Complete a basic incident report.</td>
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<td><strong>Conducting Pre-incident Surveys</strong></td>
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<td>Identify the desirable personal traits of fire service personnel who conduct fire-safety surveys.</td>
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<td>73</td>
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<td>Conduct fire-safety service surveys, using various technologies.</td>
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<td>74</td>
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<td>Define the content and goals of pre-incident/preplanning surveys.</td>
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<td>75</td>
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<td>Complete a pre-incident/preplanning survey with full documentation.</td>
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Legend: + Essential  ○ Non-essential  ☞ Omitted

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**Curriculum Framework**

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**Implementing Incident Management System (IMS)**

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**Task Number 39**

**Organize an IMS until command is transferred.**

**Definition**

Organization should include

- answering all questions typically asked of a first responder
- determining the need for command
- prioritizing an incident action plan (IAP)
• maintaining the IMS until command is transferred.

Process/Skill Questions

• What are the obvious and potential hazards of the incident?
• How is the extent of property damage assessed?
• How is the presence of civilians at the incident assessed?
• Why is it important to know the risks and benefits of engaging in the incident?

National Fire Protection Association

6.1.1.2 General Skill Requirements
...for Fire Fighter II.

Task Number 40

Function within an assigned role in the IMS.

Definition

Functioning in the following roles should be defined according to local protocols and operating procedures:

• Operations officer
• Safety officer
• Public information officer

Process/Skill Questions

• Where should the operations officer be stationed during the incident?
• What are the safety officer's responsibilities during the incident?
• Why does the fire service provide press releases? Who delivers them?

National Fire Protection Association

6.1.1.2 General Skill Requirements
...for Fire Fighter II.

Task Number 41

Demonstrate transfer of command and termination of an incident.

Definition

Demonstration should include
• documenting the situation status report
• listing response resources
• assuming and transferring command
• documenting the reason for transferring command.

Process/Skill Questions

• How is transfer of command acknowledged?
• What happens once command has been transferred?
• What is a demobilization plan?

National Fire Protection Association

6.1.1.1 General Knowledge Requirements
...for Fire Fighter II.
6.1.1.2 General Skill Requirements
...for Fire Fighter II.

Analyzing Construction Materials and Building Collapse

Task Number 42
Identify the effects of fire and fire-suppression activities on structures.

Definition

Identification should include assessing the signs of structural instability and inspecting materials for damage, such as

• wood
• reinforced concrete
• cast iron
• masonry
• steel
• gypsum wall board
• glass
• plaster on lath.

Process/Skill Questions

• What factors affect the stability of a structure after an incident?
• What are indicators of potential building collapse?
• What happens to steel when it is heated? What might happen to a structure using steel beams?

National Fire Protection Association

6.3.2 Coordinate an interior attack line for team's accomplishment of an assignment in a structure fire
...given attack lines, personnel, personal protective equipment, and tools, so that crew integrity is established; attack techniques are selected for the given level of the fire (for example, attic, grade level, upper levels, or basement); attack techniques are communicated to the attack teams; constant team coordination is maintained; fire growth and development is continuously evaluated; search, rescue, and ventilation requirements are communicated or managed; hazards are reported to the attack teams; and incident command is apprised of changing conditions.

Task Number 43

List the actions to take when imminent building collapse is suspected.

Definition

List should include the following actions:

• Set up a collapse zone upon arrival.
• Perform emergency evacuation of personnel.
• Prohibit personnel and equipment from operating within the collapse zone.
• Use unmanned master streams within the collapse zone, if fire streams are necessary.

Process/Skill Questions

• What is a collapse zone, and what determines its size?
• What types of additional defensive techniques might fire service personnel use, even after establishing a collapse zone?
• Why did so many firefighters perish during the attack on and destruction of the World Trade Center?

National Fire Protection Association

6.3.2 Coordinate an interior attack line for team's accomplishment of an assignment in a structure fire
...given attack lines, personnel, personal protective equipment, and tools, so that crew integrity is established; attack techniques are selected for the given level of the fire (for example, attic, grade level, upper levels, or basement); attack techniques are communicated to the attack teams; constant team coordination is maintained; fire growth and development is continuously evaluated; search, rescue, and ventilation requirements are communicated or managed; hazards are reported to the attack teams; and incident command is apprised of changing conditions.

Working with Rescue and Extrication Tools
Task Number 44

Demonstrate the use, care, and maintenance of power plants, lighting equipment, and auxiliary electrical equipment.

Definition

Demonstration should include procedures for tools and devices such as

- inverter
- generator, portable or vehicle-mounted
- lighting equipment, portable and fixed
- electrical cables
- extension cords
- twist-lock adapters/receptacles
- junction boxes

Process/Skill Questions

- Why are power and electrical safety issues important during a fire incident?
- What types of lighting are commonly used to support emergency operations?
- What is the purpose of a junction box?

National Fire Protection Association

6.5.2 Maintain power plants, power tools, and lighting equipment
...given tools and manufacturers' instructions, so that equipment is clean and maintained according to manufacturer and departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise.

Task Number 45

Identify rescue and extrication tools and equipment.

Definition

Identification should include

- bar screw jack
- chainsaw
- porta power tool
- ratchet-lever jack
- portable hydraulic pump
- block
- come-along
- hydraulic ram
- hydraulic jack
- spreader
- shears
- circular rescue saw
- trench screw jack
- pneumatic tools
- chisel/hammer
- air lifting bag
- truck-mounted winch
- reciprocating saw.

**Process/Skill Questions**

- Why is it crucial to use the correct tool for the job?
- What are the potential hazards of working with an air lifting bag?
- When would a hydraulic jack be useful?

**National Fire Protection Association**

6.4.1 Extricate a victim entrapped in a motor vehicle as part of a team

...given stabilization and extrication tools, so that the vehicle is stabilized, the victim disentangled without further injury, and hazards are managed.

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**Task Number 46**

**List safety guidelines for rescue and extrication tools.**

**Definition**

List should include safety guidelines for

- hydraulic tools
- jacks and cribbing
- pneumatic rescue tools
- winches
- airbags
- block and tackle.

**Process/Skill Questions**

- Where can the safety guidelines for particular pieces of equipment or tools be located?
- How do local standard operating procedures (SOPs) help minimize the risk of injury?
- What precautions should rescuers take when extricating injured victims?

**National Fire Protection Association**

6.4.1 Extricate a victim entrapped in a motor vehicle as part of a team
Task Number 47

Select tools for specific rescue and extrication situations.

Definition

Selection should be based upon

- assessing the situation
- following SOPs/SOGs
- ensuring tools are in good working order and ready to use
- locating manufacturer guidelines for tool use, procedures, and limits.

Process/Skill Questions

- What is the function of a trench screw jack?
- Why is it important to perform jacking procedures on a flat and stable surface?
- What is cribbing?

National Fire Protection Association

6.4.1 Extricate a victim entrapped in a motor vehicle as part of a team
...given stabilization and extrication tools, so that the vehicle is stabilized, the victim disentangled without further injury, and hazards are managed.

Task Number 48

Demonstrate rescue and extrication methods, using various equipment.

Definition

Demonstration should include using all related equipment, following SOPs/SOGs, and following manufacturers' guidelines when removing a victim during one- and two-rescuer operations.

Process/Skill Questions

- Why is it best to have two-rescuer teams?
- How can a single rescuer avoid injury to him/herself and to the victim?
- What is the first thing a rescuer should do at a potential rescue scene? Why?
6.4.1 Extricate a victim entrapped in a motor vehicle as part of a team
...given stabilization and extrication tools, so that the vehicle is stabilized, the victim disentangled without further injury, and hazards are managed.

6.4.2 Assist rescue operation teams
...given standard operating procedures, necessary rescue equipment, and an assignment, so that procedures are followed, rescue items are recognized and retrieved in the time as prescribed by the AHJ, and the assignment is completed.

Practicing Vehicle Extrication and Special Rescue

Task Number 49

Extricate a victim from a vehicle.

Definition

Extrication should include

- assessing the situation to determine the risks, hazards, and condition of the victim
- assigning team duties and performing crowd control, if necessary
- stabilizing the vehicle
- gaining access to the victim
- disentangling the victim
- extricating the victim
- preparing the victim for transport.

Process/Skill Questions

- What types of restraint systems might firefighters encounter? What are the removal methods?
- What is the purpose of packaging a victim?
- What are the differences between laminated glass and tempered glass?

Task Number 50
List types of building collapses and hazards associated with rescue operations.

Definition

List should include the following types of collapses:

- Cantilever—floor collapse in a high-rise building
- Lean-to—floor collapse
- Pancake—load-bearing wall collapse
- V-type—collapse occurring inward as weight is toward the middle

List should include the following types of hazards:

- Environmental—natural gas leaks, plumbing issues, lack of light, HAZMAT issues, temperatures
- Physical—debris, confinement, exposure to electrical hazards, secondary collapse

Process/Skill Questions

- What are the benefits of shoring?
- What are the benefits of cribbing?
- What precautions should be taken when entering a partially collapsed building?

National Fire Protection Association

6.4.2 Assist rescue operation teams

...given standard operating procedures, necessary rescue equipment, and an assignment, so that procedures are followed, rescue items are recognized and retrieved in the time as prescribed by the AHJ, and the assignment is completed.

Task Number 51

Describe the types of special rescue teams.

Definition

Description should include

- rope
- trench
- collapse
- confined space
- extrication
- water
- aircraft rescue and firefighting (ARFF)
- HAZMAT
• emergency medical services (EMS).

Process/Skill Questions

• What is a trench?
• What is a confined space?
• What is the difference between rescue and extrication?

National Fire Protection Association

6.4.2 Assist rescue operation teams
...given standard operating procedures, necessary rescue equipment, and an assignment, so that procedures are followed, rescue items are recognized and retrieved in the time as prescribed by the AHJ, and the assignment is completed.

Task Number 52

Describe rescues and recoveries in specific environments.

Definition

Description should include techniques, such as

• water rescue—reach, throw, row, go
• ice rescue
• machinery-related rescue—industrial, elevator, escalator.

Process/Skill Questions

• What are the differences between rescues and recoveries?
• What is the primary technique used in a rescue on thin ice?
• What happens when the go technique is used in a water rescue?

National Fire Protection Association

6.4.2 Assist rescue operation teams
...given standard operating procedures, necessary rescue equipment, and an assignment, so that procedures are followed, rescue items are recognized and retrieved in the time as prescribed by the AHJ, and the assignment is completed.

Managing Hydrant Flow and Operability
Task Number 53

Identify water flow and pressure terminology.

Definition

Identification should include the following pressure types:

- Static
- Normal operating
- Residual
- Flow

Process/Skill Questions

- How is normal water consumption demand defined?
- What should be the maximum distance between fire hydrants when they are installed in high-value locations?
- What can corrosion do to a fire hydrant? How can it be prevented?

National Fire Protection Association

6.5.4 Test the operability of and flow from a fire hydrant
...given a Pitot tube, pressure gauge, and other necessary tools, so that the readiness of the hydrant is assured and the flow of water from the hydrant can be calculated and recorded.

Task Number 54

Record hydrant flow pressures.

Definition

Recording flow pressures should include periodically testing a location by

- using and reading a pitot tube
- using the discharge equation (discharge = 1/2 x outlet diameter)
- using water flow tables
- diagnosing the cause of an obstruction in the hydrant flow, if any.

Process/Skill Questions

- What are hydrant flow codes, and how are they assigned?
- What are three conditions that may reduce hydrant effectiveness?
- What are the differences between wet-barrel and dry-barrel hydrants? Where might these hydrants be found?
6.5.4 Test the operability of and flow from a fire hydrant
...given a Pitot tube, pressure gauge, and other necessary tools, so that the readiness of the hydrant is assured and the flow of water from the hydrant can be calculated and recorded.

Working with Hose Tools and Appliances

Task Number 55

Demonstrate the use of valves, valve devices, hose-fitting appliances, and tools used with hoses.

Definition

Demonstration should include

- identifying types of valves and valve devices
- choosing the correct valves for a given fire situation
- identifying hose-fitting appliances
- identifying adapters
- identifying tools used with hoses
- choosing the correct hose-fitting appliances, adapters, and tools for given fire situations.

Process/Skill Questions

- How is a section of hose replaced in a charged line? Why might this need to be done?
- How is a charged hose line reduced or extended? Why might this need to be done?
- How are two or more lines joined into one line? Why might this need to be done?

National Fire Protection Association

6.3.1 Extinguish an ignitable liquid fire, operating as a member of a team
...given an assignment, an attack line, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a properly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, reignition is prevented, team protection is maintained with a foam stream, and the hazard is faced until retreat to safe haven is reached.

6.3.2 Coordinate an interior attack line for team's accomplishment of an assignment in a structure fire
...given attack lines, personnel, personal protective equipment, and tools, so that crew integrity is established; attack techniques are selected for the given level of the fire (for example, attic, grade level, upper levels, or basement); attack techniques are communicated to the attack teams; constant team coordination is maintained; fire growth and development is continuously evaluated; search, rescue, and ventilation requirements are
communicated or managed; hazards are reported to the attack teams; and incident command is apprised of changing conditions.

6.3.3 Control a flammable gas cylinder fire, operating as a member of a team
...given an assignment, a cylinder outside of a structure, an attack line, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, safe havens are identified prior to advancing, open valves are closed, flames are not extinguished unless the leaking gas is eliminated, the cylinder is cooled, cylinder integrity is evaluated, hazardous conditions are recognized and acted upon, and the cylinder is faced during approach and retreat.

Task Number 56

Test hose function.

Definition

Testing should include the following steps:

1. Locate a safe area to perform the test.
2. Lay the entire hose in a straight run.
3. Connect the hose sections into lengths of up to 300 feet.
4. Connect the hose test-gate valves to each pumper discharge valve being used and open the valves.
5. Connect the hose segments to the test-gate valves.
6. Attach a rope hose tool or hose strap to each test length.
7. Attach a shutoff nozzle to the open end of each test segment.
8. Open nozzles for hose filling, holding nozzles over the hydrant discharge or pump.
9. Open the discharge.
10. Fill each hose line with water.
11. Close the nozzles once air has been purged from the test segments.
12. Mark the hose jacket with chalk to indicate where the couplings meet the hose.
13. Inspect the hose line for kinks and straighten, if necessary.
15. Remove failed segments.
17. Increase the pump pressure to the NFPA standard.
18. Monitor the connections as pressure increases, checking for leaks.
19. Reduce the pressure and close discharge valves when they reach zero.
20. Disengage the pump.
21. Break all the hose connections, draining water away from the test area.
22. Observe marks at the couplings to see if any couplings moved and tag those that moved or failed.
23. Log all results.

Process/Skill Questions

- How often should hoses undergo testing?
- How much does a coupling need to move while a hose is in use to indicate the coupling may be loose or damaged?
- What are the primary indicators that a hose segment needs to be repaired or replaced?
6.5.3 Perform an annual service test on fire hose
...given a pump, a marking device, pressure gauges, a timer, record sheets, and related equipment, so that procedures are followed, the condition of the hose is evaluated, any damaged hose is removed from service, and the results are recorded.

Managing Foam Fire Streams

Task Number 57

List procedural steps and terms associated with using foam and related equipment.

Definition

List should include the procedural steps of mixing foam concentrate and assembling and operating a foam fire stream system. In addition, the following terms should be defined:

- *Hydrocarbon*
- *Polar-solvent fuel*
- *Foam concentrate*
- *Foam proportioner*
- *Foam solution*
- *Foam expansion and expansion ratio*
- *Aeration*

Process/Skill Questions

- What types of fires cannot be extinguished with water?
- Why are foam ratios and solutions important?
- What are examples of hydrocarbon fires and polar-solvent fires?
- What foams are commonly used in fire suppression?

National Fire Protection Association

6.3.1 Extinguish an ignitable liquid fire, operating as a member of a team
...given an assignment, an attack line, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a properly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, reignition is prevented, team protection is maintained with a foam stream, and the hazard is faced until retreat to safe haven is reached.
Task Number 58

List the characteristics of foam and foam production.

Definition

List should include

- the types of foam
- the letter designation for various foams
- the chemical composition of various foams
- the proportioning concentration levels that should be used for various foams
- the type of fire each foam is meant to fight
- the application method for each type of foam.

Process/Skill Questions

- What can happen if the wrong type of foam is used on a fire?
- How is the correct fuel type of a fire identified?
- Where are the letter designations for foams located?

National Fire Protection Association

6.3.1 Extinguish an ignitable liquid fire, operating as a member of a team
...given an assignment, an attack line, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a properly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, reignition is prevented, team protection is maintained with a foam stream, and the hazard is faced until retreat to safe haven is reached.

Task Number 59

Demonstrate the use and application of foam in various fire situations.

Definition

Demonstration should include

- determining the type of materials that are fueling the fire
- choosing the appropriate class of foam per fuel
- using the correct proportioning and concentration method, including
  - induction
  - injection
  - batch-mixing
  - premixing
- selecting the foam delivery device, including
o hand-line nozzles
o medium- and high-expansion foam-generating devices.

Process/Skill Questions

- Why would a fluoroprotein foam be used to fight a fire?
- What is the bank-down method, and in what situation might it be used?
- Why might poor foam generation be experienced?

National Fire Protection Association

6.3.1 Extinguish an ignitable liquid fire, operating as a member of a team

...given an assignment, an attack line, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a properly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, reignition is prevented, team protection is maintained with a foam stream, and the hazard is faced until retreat to safe haven is reached.

Controlling Ignitable Liquid and Flammable Gas Fires

Task Number 60

Compare the characteristics of flammable liquids to combustible liquids.

Definition

Comparison should include

- defining flammable liquids and combustible liquids
- providing examples of each
- defining flashpoint.

Process/Skill Questions

- What are the storage procedures for flammable and combustible liquids?
- What are examples of flammable liquids?
- What are examples of combustible liquids?

National Fire Protection Association
6.3.3 Control a flammable gas cylinder fire, operating as a member of a team
...given an assignment, a cylinder outside of a structure, an attack line, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, safe havens are identified prior to advancing, open valves are closed, flames are not extinguished unless the leaking gas is eliminated, the cylinder is cooled, cylinder integrity is evaluated, hazardous conditions are recognized and acted upon, and the cylinder is faced during approach and retreat.

Task Number 61

Demonstrate methods used to suppress Class B fires.

Definition

Demonstration should include applying water to cool the flammable liquid vessels and identifying the following precautions:

- Avoid standing in pools of fuel.
- Avoid trying to extinguish fires around relief valves or piping.
- Eliminate all ignition sources in the fire area.
- Be aware of the potential for vessel rupture.
- Do not rely on relief valves to perform as designed.

Process/Skill Questions

- Why is using water an excellent method for suppressing a Class B fire?
- What is a relief valve, and how can it help suppress a Class B fire?
- What are the potential ignition sources in a fire area?

National Fire Protection Association

6.3.3 Control a flammable gas cylinder fire, operating as a member of a team
...given an assignment, a cylinder outside of a structure, an attack line, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, safe havens are identified prior to advancing, open valves are closed, flames are not extinguished unless the leaking gas is eliminated, the cylinder is cooled, cylinder integrity is evaluated, hazardous conditions are recognized and acted upon, and the cylinder is faced during approach and retreat.

Task Number 62

Describe the signs and effects of boiling, liquid, expanding, vapor, explosion (BLEVE).

Definition

Description should include the signs of an impending explosion, such as
When a BLEVE explosion occurs, pressure from liquids turning into gas have forced the expansion of the metal container to its breaking point, causing a rupture and producing a fire ball that shoots fragments from the container in all directions.

**Process/Skill Questions**

- What is the purpose of a relief-valve flame, and why does it increase in size when experiencing BLEVE?
- What is the best method for preventing BLEVE?
- What causes the pinging sound associated with BLEVE?

**National Fire Protection Association**

6.3.3 Control a flammable gas cylinder fire, operating as a member of a team

...given an assignment, a cylinder outside of a structure, an attack line, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, safe havens are identified prior to advancing, open valves are closed, flames are not extinguished unless the leaking gas is eliminated, the cylinder is cooled, cylinder integrity is evaluated, hazardous conditions are recognized and acted upon, and the cylinder is faced during approach and retreat.

**Task Number 63**

**Demonstrate methods for suppressing bulk-transport vehicle fires.**

**Definition**

Demonstration should include

- performing vapor-suppression techniques
- identifying the spill material
- controlling traffic and closing the lanes that are affected by the spill or that are required for operating safely
- rescuing the victims, if necessary
- attacking the fire from two sides.

**Process/Skill Questions**

- What are the best methods for identifying spill materials? Why is this essential?
- Why should traffic be a top priority?
- What is the best method for approaching a victim inside a burning bulk-transport vehicle?
6.3.3 Control a flammable gas cylinder fire, operating as a member of a team
...given an assignment, a cylinder outside of a structure, an attack line, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, safe havens are identified prior to advancing, open valves are closed, flames are not extinguished unless the leaking gas is eliminated, the cylinder is cooled, cylinder integrity is evaluated, hazardous conditions are recognized and acted upon, and the cylinder is faced during approach and retreat.

Examining Fire Detection, Alarm, and Suppression Systems

Task Number 64

Identify types of initiating devices and their components.

Definition

Identification should include

- automatic alarms (e.g., heat detectors, smoke detectors, flame detectors, fire-gas detectors, wet-pipe and dry-pipe sprinkler systems)
- manual alarms (e.g., pull boxes, break glass call points).

Identification should also include descriptions of the sensor devices in specified alarms and the various types of alarm output (e.g., audible, visual).

Process/Skill Questions

- What are the shortcomings of audible alarms?
- What are some auxiliary services provided by alarm systems?
- How does an automatic, dry-pipe fire suppression system operate?

National Fire Protection Association

6.5.1 Prepare a pre-incident survey
...given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

Task Number 65

Identify types of automatic alarm systems.
Definition

Identification should include auxiliary systems, such as

- local energy
- shunt
- parallel telephone
- remote station
- proprietary
- central station.

Process/Skill Questions

- How often should automatic alarms be tested?
- How do newer systems differ from older systems? What have been the major improvements?
- Where should carbon monoxide detectors be installed?

National Fire Protection Association

6.5.1 Prepare a pre-incident survey
...given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

Task Number 66

Identify sprinkler system applications and components.

Definition

Identification should include the following:

- Wet-pipe system—an alarm-check valve or backflow-prevention valve, a pressure gauge, and an electronic alarm
- Dry-pipe system—an air-pressure gauge located above a clapper and a water-pressure gauge below a clapper
- Preaction system—a deluge-type valve, fire-detection devices, and closed sprinklers
- Deluge system—open sprinkler heads with a deluge valve
- Residential system—fast-response sprinklers tied into wet or dry systems, air- or water-pressure gauges, a flow detector, and a system drain

Process/Skill Questions

- Where might dry-pipe systems be found?
- What are the benefits of using a deluge system?
- What are closed sprinklers, and how do they operate?

National Fire Protection Association
6.5.1 Prepare a pre-incident survey
...given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

Task Number 67

Inspect sprinkler systems.

Definition

Inspection should include

- recording missing or damaged components
- checking power supply
- checking water supply
- testing pressure gauges
- checking for obstructions at sprinkler heads, including painted heads.

Process/Skill Questions

- Why should a sprinkler head be free of paint?
- Why is it important to record all damaged components and their locations when inspecting sprinkler systems?
- How often should systems be inspected?
- What are the two types of power supply sources for a fire-annunciator control panel?

National Fire Protection Association

6.5.1 Prepare a pre-incident survey
...given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

Determining Fire Cause and Origin

Task Number 68

Assist a fire investigator for an origin and cause determination.

Definition

Assistance should include
- protecting evidence
- assessing and analyzing the scene
- documenting the process rigorously
- reporting to the fire chief
- appearing in court, as needed, as a material witness or expert.

Process/Skill Questions

- What is involved in protecting evidence at a fire scene?
- What are the main reasons for determining the cause of any fire and the resulting personal and property damage?

National Fire Protection Association

6.3.4 Protect evidence of fire cause and origin
...given a flashlight and overhaul tools, so that the evidence is noted and protected from further disturbance until investigators can arrive on the scene.

Task Number 69

Protect evidence of fire cause and origin.

Definition

Protection should include

- posting guard(s) at the scene and preventing unauthorized personnel from entering
- boarding doors and windows
- marking, tagging, and photographing all evidence
- logging the names of personnel at the scene.

Process/Skill Questions

- When and why does the fire department's authority end at a fire scene?
- Why should the names of personnel at a fire scene be recorded?
- Why would any unauthorized person try to gain entrance to a fire scene?

National Fire Protection Association

6.3.4 Protect evidence of fire cause and origin
...given a flashlight and overhaul tools, so that the evidence is noted and protected from further disturbance until investigators can arrive on the scene.
Completing Radio Communications and Incident Reports

Task Number 70

Complete a basic incident report.

Definition

Completion should include

- name of the fire department
- incident number
- district name/number
- shift number
- number of alarms
- names and addresses of occupants, owners, victims
- structure information
- origin of report
- type of operation (e.g., fire, HAZMAT, medical, rescue)
- action taken (e.g., investigation, extinguishment, rescue, mitigation)
- injuries and fatalities
- number of responding personnel
- type of response and responding apparatus used
- determination of fire origin and cause
- outcome of the situation
- damage estimate
- comments or narrative of the events.

Process/Skill Questions

- How can incident reports aid in preventing future losses from fires?
- Who is responsible for creating and filing the incident report?
- What sources can aid in the completion of incident reports?

National Fire Protection Association

6.2.1 Complete a basic incident report

...given the report forms, guidelines, and information, so that all pertinent information is recorded, the information is accurate, and the report is complete.

Task Number 71
Respond to requests for additional resources.

Definition

Response should include

- following local IMS and SOPs/SOGs for communication with the incident commander
- maintaining contact with the team
- calling for the appropriate number and types of units
- ordering multiple alarms
- following protocols for working with mobile command posts and communications centers.

Process/Skill Questions

- What are special alarm signals?
- Who is responsible for calling for multiple alarms?
- What are some situations for which additional resources might be required?

National Fire Protection Association

6.2.2 Communicate the need for team assistance

...given fire department communication equipment, standard operating procedures (SOPs), and a team, so that the supervisor is consistently informed of team needs, departmental SOPs are followed, and the assignment is accomplished safely.

Conducting Pre-incident Surveys

Task Number 72

Identify the desirable personal traits of fire service personnel who conduct fire-safety surveys.

Definition

Identification should include the ability to

- clearly and concisely express themselves
- facilitate positive public relations
- plan, organize, and execute a survey on schedule
- negotiate
- use comprehensive fire service knowledge to encourage safety.

Process/Skill Questions
• What are the most important personal and professional traits of those who conduct fire-safety surveys?
• What are the fire service's goals when conducting fire-safety surveys?
• Why must surveyors possess a high degree of knowledge about building construction?

National Fire Protection Association

6.5.1 Prepare a pre-incident survey
...given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

Task Number 73

Conduct fire-safety service surveys, using various technologies.

Definition

Conducting surveys should include

• wearing protective clothing
• using a respirator, when needed
• using a flash-equipped camera
• using a pitot tube and gauges for water tests
• using measuring equipment.

Process/Skill Questions

• When should a respirator be used during a fire-safety survey?
• What resource or reference is consistently used by surveyors?
• How is a pitot tube used to test water?

National Fire Protection Association

6.5.1 Prepare a pre-incident survey
...given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

Task Number 74

Define the content and goals of pre-incident/preplanning surveys.

Definition

Definition of survey content (e.g., notes, data, maps, sketches) should include all attendant data for

• firefighter protection
• occupant protection and evacuation
• fire control
• property conservation
• completed department survey forms.

Definition of survey goals should include

• promotion of proprietor/civilian fire prevention
• reduction of loss or damage to proprietor/civilian
• increase in the safety of firefighters, should an incident occur.

Process/Skill Questions

• Why are pre-incident surveys conducted?
• What security issues might arise when conducting ground operations at a property?
• Why is it important for firefighters to know the location of high-value contents in a property?

National Fire Protection Association

6.5.1 Prepare a pre-incident survey
...given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

Task Number 75

Complete a pre-incident/preplanning survey with full documentation.

Definition

Completion should include documentation (e.g., notes, data, maps, sketches) of

• exterior survey results
• survey of each interior floor and room
• hazards and hazardous materials
• structural components subject to failure
• confusing layout features
• locations of exits and windows
• owner's contact information and location of premises
• numbers of inhabitants or employees on premises and their work hours
• water supply
• facility-based fire-protection and fire-suppression system, if any
• forcible-entry issues
• security issues
• ventilation data
• high-value contents in the facility, by location and type
• exit interview and results.
### Process/Skill Questions

- What does an exit interview for a pre-incident survey entail, and what purpose does it serve?
- How do field sketches differ from report drawings?
- How does conducting a pre-incident survey benefit firefighters, facility owners, and the community?

### National Fire Protection Association

**6.5.1 Prepare a pre-incident survey**

...given forms, necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

### SOL Correlation by Task

<table>
<thead>
<tr>
<th>Task Description</th>
<th>English:</th>
<th>History and Social Science:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organize an IMS until command is transferred.</td>
<td>11.5, 12.5</td>
<td>GOVT.1</td>
</tr>
<tr>
<td>Function within an assigned role in the IMS.</td>
<td>11.3, 12.3</td>
<td></td>
</tr>
<tr>
<td>Demonstrate transfer of command and termination of an incident.</td>
<td>11.6, 11.7, 12.6, 12.7</td>
<td>GOVT.1</td>
</tr>
<tr>
<td>Identify the effects of fire and fire-suppression activities on structures.</td>
<td>11.5, 12.5</td>
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<tr>
<td>List the actions to take when imminent building collapse is suspected.</td>
<td>11.6, 11.7, 12.6, 12.7</td>
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<tr>
<td>Demonstrate the use, care, and maintenance of power plants, lighting equipment, and auxiliary electrical equipment.</td>
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<td>Identify rescue and extrication tools and equipment.</td>
<td>11.5, 12.5</td>
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<tr>
<td>List safety guidelines for rescue and extrication tools.</td>
<td>11.6, 11.7, 12.6, 12.7</td>
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<tr>
<td>Select tools for specific rescue and extrication situations.</td>
<td>11.6, 11.7, 12.6, 12.7</td>
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<td>Demonstrate rescue and extrication methods, using various equipment.</td>
<td>11.5, 12.5</td>
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<tr>
<td>Extricate a victim from a vehicle.</td>
<td>11.6, 11.7, 12.6, 12.7</td>
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<td>List types of building collapses and hazards associated with rescue operations.</td>
<td>11.5, 12.5</td>
<td></td>
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<tr>
<td>Describe the types of special rescue teams.</td>
<td>11.5, 12.5</td>
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<tr>
<td>Describe rescues and recoveries in specific environments.</td>
<td>11.5, 12.5, 12.6, 12.7</td>
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<tr>
<td>Identify water flow and pressure terminology.</td>
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<td>Record hydrant flow pressures.</td>
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<tr>
<td></td>
<td>Science: PH.5</td>
<td></td>
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<tr>
<td></td>
<td>Mathematics: A.4</td>
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<td>Task</td>
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<td>Demonstrate the use of valves, valve devices, hose-fitting appliances, and tools used with hoses.</td>
<td>English: 11.6, 11.7, 12.6, 12.7</td>
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<td>Test hose function.</td>
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**Firefighting Resources**

Virginia Fire Website

Parental consent form
- [http://www.vafire.com/training/become_a_firefighter.htm](http://www.vafire.com/training/become_a_firefighter.htm)
Customer Service Infusion Units

Customer Service Infusion Units (CSIU) were designed to be infused with designated CTE courses to help students in those programs achieve additional, focused, validated tasks/competencies in customer service. These units are not mandatory, and, as such, the tasks/competencies are marked as *optional*, to be taught at the instructor's discretion.

Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.”
Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- College and Work Readiness Assessment (CWRA+)
- Customer Service Examination
- Customer Service Specialist (CSS) Examination
- Emergency and Fire Management Services Assessment
- Firefighter I Certification Examination
- Firefighter II Certification Examination
- National Career Readiness Certificate Assessment
- Professional Communications Certification Examination
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- Firefighting I (8705/36 weeks, 280 hours)

<table>
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<td>Dispatcher&lt;br&gt;Emergency Medical Technician, Paramedic&lt;br&gt;Fire Investigator&lt;br&gt;Firefighter&lt;br&gt;Hazardous Materials Removal Worker</td>
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