

LESSON ONE

FIREFIGHTER I

Ladders

DOMAIN: COGNITIVE / PSYCHOMOTOR

LEVEL OF LEARNING: COMPREHENSION /
APPLICATION

MATERIALS

Overhead projector or laptop computer and multimedia projector; projection screen; folding attic ladder, metal roof ladder, metal 24 ft. (7.3m) extension ladder, 14 ft. (4.3 m) metal straight ladder, aerial devices, and any ladder types used by the authority having jurisdiction such as wooden ladders, or fiberglass ladders; NFPA1931 and NFPA 1932, Standard On Ladder Use and Maintenance; IFSTA Essentials 5th edition or Jones and Bartlett Fundamentals of Fire Fighter Skills 2nd Edition or Delmar Firefighter's Handbook 3rd Edition.

NFPA 1001 JPR, 2008 edition

5.3.6 Set up ground ladders

Junior Member Statement:

Junior Member training activities should be supervised by qualified instructors to assure that the cognitive and psychomotor skills are completed in a safe and non-evasive manner. While it is critical that instructors be constantly aware of the capabilities of all students both mentally and physically to complete certain tasks safely and successfully, the instructor should take every opportunity to discuss with departmental leaders and students the maturity and job awareness each participant has for the hazards associated with fire and rescue training.

TERMINAL OBJECTIVE

The Firefighter I candidate shall correctly identify and describe the appropriate use of the following ladders:

- a) Folding / attic ladder.
- b) Roof ladder.
- c) Extension Ladder.
- d) Straight / wall ladder.

ENABLING OBJECTIVES

1. The Firefighter I candidate shall correctly identify in writing the basic parts of a fire service ladder.
2. The firefighter I candidate shall correctly identify in writing the construction materials and designs used for fire service ladders.
3. The Firefighter I candidate, when given a folding / attic ladder, shall correctly identify and describe in writing the use of the ladder.
4. The Firefighter I candidate, when given a roof ladder, shall correctly identify and describe in writing the use of the ladder.
5. The Firefighter I candidate, when given an extension ladder, shall correctly identify and describe in writing the use of the ladder.
6. The Firefighter I candidate, when given a straight / wall ladder, shall correctly identify and describe in writing the use of the ladder.

LESSON ONE

FIREFIGHTER I

Ladders

MOTIVATION

The fire service ladder is recognized as a versatile firefighting tool. Historically the key use of the fire service ladder was to assist firefighters with the task of gaining access to elevated areas of structures. With advances in technology, new designs and materials have made today's fire service ladder stronger and more flexible than its forefather. Today's ladder is called on for a variety of emergency tasks. Firefighters must realize that the ladder is a life safety piece of equipment. When it is not used properly or maintained according to specified guidelines, the results may be disastrous. Fire department personnel must take into consideration factors such as terrain, life hazards, weather conditions, and structural conditions when developing standard ladder practices and procedures. Teamwork, communication, and safety are necessary components of an efficient ladder team. Knowing which ladder to use in the performance of a specific task will benefit the firefighter and make the job easier and safer.

NOTE: The use of fire service ladders during adverse conditions requires an attention to safety not often associated with the everyday use of commercial ladders.

NOTE: Application of this lesson plan should take place on the training grounds using ladders described in the above materials section as opposed to the classroom identifying pictures. Caution should be used when raising any ladders to avoid possible overhead electrical hazards.

PRESENTATION

ENABLING OBJECTIVE #1

The Firefighter I candidate shall correctly identify in writing the basic parts of a fire service ladder.

1. Using an extension ladder and a roof ladder, identify the basic parts of each ladder.

Reference:

Delmar Handbook 3rd edition, page 417.

J&B Fundamentals 2nd edition, pages 327-329

IFSTA Essentials 5th edition, pages 472-475

PRESENTATION

ENABLING OBJECTIVE #2

The firefighter I candidate shall correctly identify in writing the construction materials and designs used for fire service ladders.

1. Describe the construction features of the following types of ladders:
 - a) Metal.
 - b) Wooden.
 - c) Fiberglass.

Reference:

IFSTA Essentials 5th edition, page 478

PRESENTATION

ENABLING OBJECTIVE #3

The Firefighter I candidate, when given a folding / attic ladder, shall correctly identify and describe in writing the use of the ladder.

1. Identify and discuss the functions of a folding / attic ladder.
 - a) They have hinged rungs so that they can be folded into a compact assembly.
 - b) Folding ladders are narrower when open than regular single ladders making climbing awkward and leg locking impractical.
 - c) Lengths range from 8 to 16 feet, with 10 feet being the most common.
 - d) NFPA 1931 requires foot pads for folding ladders

- e) They have limited weight loading - less than half a regular single ladder.
- f) They are used primarily in attic openings, closets, or other restricted areas.

Reference:

Delmar Handbook 3rd edition, page 421.

J&B Fundamentals 2nd edition, pages 331-332

IFSTA Essentials 5th edition, page 476

PRESENTATION

ENABLING OBJECTIVE #4

The Firefighter I candidate, when given a roof ladder, shall correctly identify and describe in writing the use of the ladder.

1. Identify and discuss the functions of a roof ladder.
 - a) Identify the $\frac{3}{4}$ " hooks attached to the end.
 - b) Lengths vary from 12 feet to 24 feet.
 - c) Discuss the use of the hooks. They are used for placing over the ridge of the roofline to add secure footing. They should be opened on the ground.
 - d) Older roof ladders with $\frac{5}{8}$ " hooks should be replaced with $\frac{3}{4}$ " hooks as per NFPA 1932 Standard on Ladder Use and Maintenance.
 - e) The roof ladder helps to distribute weight over a greater area of the roof.

Reference:

Delmar Handbook 3rd edition, page 420.

J&B Fundamentals 2nd edition, page 330

IFSTA Essentials 5th edition, page 476

PRESENTATION

ENABLING OBJECTIVE #5

The Firefighter I candidate, when given an extension ladder, shall correctly identify and describe in writing the use of the ladder.

1. Identify and discuss the functions of an extension ladder.

- a) Extension ladders have two or three sections.
- b) Ladder lengths generally range from 12 to 39 ft.
- c) Upper sections are raised by rope or cable.
- d) The ladder is designated for the full length it can be extended.
- e) Toggles are devices by which stay-poles are attached to extension ladders.

Reference:

Delmar Handbook 3rd edition, pages 419-420.

J&B Fundamentals 2nd edition, pages 330-331

IFSTA Essentials 5th edition, page 476

PRESENTATION

ENABLING OBJECTIVE #6

The Firefighter I candidate, when given a straight / wall ladder, shall correctly identify and describe in writing the use of the ladder.

1. Identify and discuss the functions of a single / wall ladder.
 - a) It has only one section.
 - b) They are of a fixed length.
 - c) Lengths range from 6 feet to 32 feet.
 - d) The ladder can be quickly placed by a single firefighter.

Reference:

Delmar Handbook 3rd edition, page 419.

J&B Fundamentals 2nd edition, page 330

IFSTA Essentials 5th edition, page 476

NOTE: Although the following ladder types are not covered in this NFPA objective, the instructor may choose to include them in the lesson plans if these types of ladders are used by the authority having jurisdiction in the area where this subject is being taught.

POLE OR BANGOR LADDERS

1. Identify and discuss the components of the pole ladders, sometimes referred to as bangor ladders.

- a) Extension ladders with stay-poles for added stability.
- b) They are manufactured with two to four sections.
- c) Lengths do not exceed 50 feet.
- d) Their use is limited due to manpower needed.
- e) They allow ladder operations on buildings where aerial apparatus is not available or cannot gain access.
- f) NFPA 1931 requires staypoles on extension ladders 40 ft. or longer.
- g) 28-35 ft. ladders should be used when attempting to gain access to the roof or window of a two-story building.
- h) 40-50 ft. ladders should be used when attempting to gain access to a roof or window of a three-story building.

Reference:

J&B Fundamentals 2nd edition, page 331

IFSTA Essentials 5th edition, page 477

COMBINATION OR A-FRAME LADDERS

1. Identify and discuss the components of the combination ladder, sometimes referred to as an A-Frame ladder.
 - a) They can be used as either a stepladder or single or extension ladder.
 - b) Lengths range from 8 feet to 14 feet with the most popular being the 10 feet model.
 - c) They are usually employed for interior operations such as reaching light fixtures.

Reference:

Delmar Handbook 3rd edition, page 421.

J&B Fundamentals 2nd edition, page 331

IFSTA Essentials 5th edition, page 478

POMPIER LADDERS

1. Identify and discuss the components of the pompier ladder and discuss its role in today's fire service.
 - a) Single beam ladder.
 - b) The rungs on this type of ladder project from either side of the single beam.

- c) The ladder has a large gooseneck top from which the ladder is suspended from windows or other openings.
- d) They are used mainly in training in today's fire service, but may be utilized in scaling operations to reach points beyond the reach of aerial apparatus or other ground ladders.
- e) NFPA 1931 specifies that these ladders should not exceed 16 feet in length.

Reference:
IFSTA Essentials 5th edition, page 478

SUMMARY

Review the parts of the fire service ladder.

Review the construction features of the fire service ladder.

Review the functions of the ladders listed in the lesson plan.

LESSON TWO

FIREFIGHTER I

Ladders

DOMAIN: PSYCHOMOTOR

LEVEL OF LEARNING: APPLICATION

MATERIALS

Overhead projector or laptop computer and multimedia projector; projection screen; IFSTA Essentials 5th edition or Jones and Bartlett Fundamentals of Fire Fighter Skills 2nd Edition or Delmar Firefighter's Handbook 3rd Edition; 14-ft. (3-4m) single or wall ladder, 24 ft. (7.3) extension ladder, and 35 ft. (11.7m) extension ladder; rope hose tools, rope, and assorted fire fighting tools; Class 'A' pumper.

NFPA 1001 JPRs, 2008 edition

- 5.3.6 Set up ground ladders
- 5.3.9 Conduct a search and rescue in a structure
- 5.3.10 Attack an interior structure fire
- 5.3.12 Perform vertical ventilation on a structure

Junior Member Statement:

Junior Member training activities should be supervised by qualified instructors to assure that the cognitive and psychomotor skills are completed in a safe and non-evasive manner. While it is critical that instructors be constantly aware of the capabilities of all students both mentally and physically to complete certain tasks safely and successfully, the instructor should take every opportunity to discuss with departmental leaders and students the maturity and job awareness each participant has for the hazards associated with fire and rescue training.

TERMINAL OBJECTIVE

The Firefighter I candidate, when given the necessary equipment, shall correctly demonstrate the proper methods of carrying, raising and lowering, positioning, and using ground ladders in the performance of duties such as moving patients to safety, and moving tools and equipment while ascending and descending ladders.

ENABLING OBJECTIVES

1. The Firefighter I candidate, when given a variety of ladders, shall correctly demonstrate carrying, positioning, raising and lowering the ladders.
2. The Firefighter I candidate shall correctly demonstrate two methods of safely locking off on a ladder.
3. The Firefighter I candidate, when given a variety of tools, shall correctly demonstrate proper hand placement and techniques for carrying them while ascending and descending the ladder.
4. The Firefighter I candidate shall correctly demonstrate one of the three methods of ladder rescue.
 - a) Patient facing rescuer.
 - b) Patient facing away from rescuer.
 - c) Rescuer cradle method. Optional to use two rescuers on two ladders for light patient and three ladders for heavy patient.
5. The Firefighter I candidate, when given the proper equipment, shall correctly demonstrate placing the roof ladder on a pitched roof using one of the methods taught.

LESSON TWO

FIREFIGHTER I

Ladders

MOTIVATION

In order for the firefighter to be proficient using any type of ground ladder, several functions have to be mastered. To insure safety for themselves and bystanders, the firefighters must be able to safely carry and position the ladder. Proper positioning, raising and lowering of the ladder will insure overall fire ground safety. When being used to perform tasks at an emergency scene, fire service ladders provide a platform for work as well as a means of rescue for patients. Proper procedures must be followed to insure that these tasks are performed safely. Standard Operating Guidelines must be established so that full use of the ladders can be achieved.

Note: This lesson plan does not address operations from an aerial device. Instructors should obtain a copy of SOGs from the department training on its aerial device.

NOTE: Application of this lesson plan should take place on the training grounds using ladders described in the above materials section as opposed to the classroom identifying pictures. Caution should be used when raising any ladders to avoid possible overhead electrical hazards. It is important to remember that when lifting a ladder, the fire fighter should bend from the knees, keeping the back straight, and lift with the legs.

PRESENTATION

ENABLING OBJECTIVE #1

The Firefighter I candidate, when given a variety of ladders, shall correctly demonstrate carrying, positioning, raising and lowering the ladders.

1. Briefly discuss and demonstrate the way one firefighter can remove and carry a ladder.
 - a) The low shoulder method from the ground.
 - b) The high shoulder method from the apparatus and the ground.
 - c) The arm's length method from the apparatus and the ground.
 - d) Special method for roof ladders.
2. Briefly discuss and demonstrate the way two firefighters can carry a ladder.
 - a) The low shoulder method from the apparatus and the ground.
 - b) The arm's length on edge method from the ground.
3. Briefly discuss and demonstrate the way three firefighters can carry a ladder by:
 - a) The flat shoulder method from the ground.
 - b) The flat arms length method from the ground.
 - c) Arms length on edge method from the ground.
4. Discuss the fact that the same methods are used for four firefighter ladder carries, with a change in firefighter position due to an additional person.
5. Demonstrate carries using four firefighters using the methods listed in #3 a-c.
6. If a department uses pole or Bangor ladders, a five or six firefighter carry will be necessary. The instructor should be aware of this carrying method if the local jurisdiction requires its use.
7. Briefly discuss and demonstrate the responsibility for properly positioning ground ladders.
 - a) Point out who will normally designate the general location where ladders are to be positioned.
 - b) Explain that fire fighter placement of the ladder will designate who controls the ladder movement and gives ladder commands.

- c) Point out that the fly section should be placed out and away from the building.
8. Discuss the two objectives that need to be met when placing ladders.
- a) Proper placement of the ladder for its intended use.
 - b) Proper placement of the butt end of the ladder should be at an approximate 75° angle for the correct distance from the building for safe and easy climbing.
 - c) Divide the used length of the ladder by 4.
9. Discuss the factors of intended use and how they affect placement.
- a) If the ladder is to be used to provide a vantage point where a firefighter can break out a window for ventilation, it should be placed alongside the window to the windward side. The tip should be about even with the top of the window.
 - b) The same position is used when firefighters climb into or out of narrow windows.
 - c) If the ladder is to be used for rescue from a window, usually the ladder tip is placed even with or slightly below the sill. If the sill projects out from the wall, the tip of the ladder can be wedged up under the sill for additional stability. If the window opening is wide enough to permit the ladder tip to project into it and still allow room beside it to facilitate the rescue; the ladder should be placed so that two or three rungs extend above the sill.
 - d) The same position is used for firefighters to climb into or out of wide window openings.
 - e) When a ladder is to be used as a vantage point to direct a hose stream into a window opening and no entry is to be made, it is raised directly in front of the window with the tip on the wall above the window opening.
10. Discuss other ladder placement guidelines.
- a) Ladder a minimum of two points on different sides of a structure.

- b) Avoid placing ladder over window and door openings.
 - c) Take advantage of strong points on the building.
 - d) Raise ladder directly in front of a window when using it to support a smoke ejector.
11. Discuss the seven locations to avoid in placing ladders.
- a) Avoid overhead obstructions.
 - b) Avoid uneven terrain.
 - c) Avoid main travel paths.
 - d) Avoid burning or high heat surfaces and direct flame impingement.
 - e) Avoid sidewalk elevator trap doors and manhole covers.
 - f) Avoid unstable walls and other surfaces.
 - g) Avoid overhead electrical wires.
12. Discuss and demonstrate the one-firefighter raise for short single and roof ladders.
13. Discuss and demonstrate the one-fire fighter raise for long single and roof ladders.
14. Discuss and demonstrate the one-firefighter raise for extension ladders.
15. Discuss and demonstrate the two-firefighter raise using the flat method.
16. Discuss and demonstrate the two-firefighter raise using the beam method.
17. Discuss and demonstrate the three-firefighter raise using the flat method.
18. Discuss and demonstrate the four-firefighter raise using the flat method.
19. Discuss and demonstrate tying the ladder in.

Reference:

Delmar Handbook 3rd edition, page 437-457.

J&B Fundamentals 2nd edition, pages 335-355

NOTE: There are two usual places that the firefighter may have to access and carry a ground ladder, from a

fire apparatus and from the ground. The instructor should review both methods.

PRESENTATION

ENABLING OBJECTIVE #2

The Firefighter I candidate shall correctly demonstrate two methods of safely locking off on a ladder.

1. Go over ladder climbing skills such as proper angle of inclination, checking pawls to insure their proper engagement.
2. Demonstrate two methods of locking off on a ladder.
 - a) Life Belt.
 - b) Leg Lock.

Reference:

Delmar Handbook 3rd edition, page 432-435;455;457.

J&B Fundamentals 2nd edition, pages 355-358

IFSTA Essentials 5th edition, pages 503-505

PRESENTATION

ENABLING OBJECTIVE #3

The Firefighter I candidate, when given a variety of tools, shall correctly demonstrate proper hand placement and techniques for carrying them while ascending and descending the ladder.

1. Discuss and demonstrate the correct way to move tools and equipment up and down ladders.
 - a) Use one hand to carry the tool.
 - b) Slide the free hand under the beam while making the climb.

Reference:

Delmar Handbook 3rd edition, page 458-459.

J&B Fundamentals 2nd edition, pages 355-356

IFSTA Essentials 5th edition, page 504

NOTE: Stress the need to use ropes to hoist and lower tools and equipment, when possible, as opposed to carrying them by hand up and down the ladder.

PRESENTATION

ENABLING OBJECTIVE #4

The Firefighter I candidate shall correctly demonstrate one of the three methods of ladder rescue.

- a) Patient facing rescuer.
 - b) Patient facing away from rescuer.
 - c) Rescuer cradle method. Optional to use two rescuers on two ladders for light patient and three ladders for heavy patient.
1. Demonstrate the patient facing away from the rescuer method.
 2. Demonstrate patient facing the rescuer method.
 3. Demonstrate the rescuer cradle method.
 - a) Patient is positioned horizontally as the patient is being passed out of a window or over a ledge.
 - b) Single rescuer supports patient under the arm and through the crotch.

Reference:

Delmar Handbook 3rd edition, page 538, 540.

J&B Fundamentals 2nd edition, pages 390-396

IFSTA Essentials 5th edition, pages 505-507

NOTE: This method works only for light patients. For heavy patients additional firefighters may be needed to assist working from separate ladders.

PRESENTATION

ENABLING OBJECTIVE # 5

The Firefighter I candidate, when given the proper equipment, shall correctly demonstrate placement of a roof ladder on a pitched roof using one of the methods taught.

1. Discuss and demonstrate the method used in placing a roof ladder on a pitched roof when performed by one firefighter.
 - a) Low-shoulder carry.
 - b) Discuss the Ladders Selection Guide.

2. Discuss and demonstrate placement of a roof ladder when performed by two firefighters.
 - a) Two-firefighter hook first method.
3. Discuss and demonstrate the two-firefighter butt first method.
4. Discuss and demonstrate the two-firefighter modified butt first method.

Reference:

Delmar Handbook 3rd edition, page 460-463.

J&B Fundamentals 2nd edition, pages 357-360

IFSTA Essentials 5th edition, pages 499-500

APPLICATION

The instructor should divide the candidates into groups for a round-robin scenario exercise. As one group performs various carries, raises and lowers, another group will work with placement and climbing techniques. The third group should work on placement of roof ladders using the one and two firefighter methods.

NOTE: Since rescue operations are inherently dangerous, even during practice, this evolution should be carried out only after the other evolutions have been completed to allow additional instructors to be stationed at strategic areas for student monitoring. This will reduce the possibility of an accident.

SUMMARY

This lesson has concentrated on the proper carrying, raising, and lowering techniques for firefighters using fire service ladders. Candidates have worked with skills of climbing and moving tools and equipment up and down these ladders. The correct ways to bring injured victims down ladders, and how to position roof ladders have been demonstrated. This lesson stressed safety as a necessary requirement for the functions carried out. The knowledge gained here will greatly benefit the firefighter candidate when asked to perform these ladder tasks on the fire ground.

LESSON THREE

FIREFIGHTER I

Ladders

DOMAIN: PSYCHOMOTOR

LEVEL OF LEARNING: APPLICATION

MATERIALS

Overhead projector or laptop computer and multimedia projector; projection screen; IFSTA Essentials 5th edition or Jones and Bartlett Fundamentals of Fire Fighter Skills 2nd Edition or Delmar Firefighter's Handbook 3rd Edition; single or wall ladder; roof ladder; soft bristle brush; garden hose or other type of water source; soap solution and safety solvent suitable for metal, wood, or fiberglass.

NFPA 1001 JPR, 2008 edition

5.5.1 Clean and check ladders, ventilation equipment, self contained breathing apparatus (SCBA), ropes, salvage equipment, and hand tools

Junior Member Statement:

Junior Member training activities should be supervised by qualified instructors to assure that the cognitive and psychomotor skills are completed in a safe and non-evasive manner. While it is critical that instructors be constantly aware of the capabilities of all students both mentally and physically to complete certain tasks safely and successfully, the instructor should take every opportunity to discuss with departmental leaders and students the maturity and job awareness each participant has for the hazards associated with fire and rescue training.

TERMINAL OBJECTIVE

The Firefighter I candidate, when given the necessary equipment, shall correctly demonstrate the methods of cleaning and inspecting different types of fire service ladders.

ENABLING OBJECTIVES

1. The Firefighter I candidate, when given the necessary equipment, shall correctly demonstrate accepted procedures for cleaning different types of fire service ground ladders.
2. The Firefighter I candidate, when given the necessary equipment, shall correctly demonstrate the procedures for inspecting and maintaining different types of fire service ground ladders.

LESSON THREE

FIREFIGHTER I

Ladders

MOTIVATION

In order to preserve ladder integrity, and extend the working life and life safety capabilities of all fire service ground ladders, the firefighter must be familiar with and use ladder cleaning and inspection procedures. Lack of appropriate cleaning can lead to carbon, tar and grease build-up that will potentially weaken the ladder and impair safe footing while climbing the ladder. In conjunction with proper cleaning, inspection after each cleaning will insure the overall safety and proper operations of the ladder thus reducing the chance of a catastrophic failure.

PRESENTATION

ENABLING OBJECTIVE #1

The Firefighter I candidate, when given the necessary equipment, shall correctly demonstrate accepted procedures for cleaning different types of fire service ground ladders.

1. Demonstrate the procedure for cleaning a ground ladder with a soapy solution, removing dirt with a soft bristle brush and running water. Look for any structural defects while washing.
2. Discuss the importance of using solvents.
 - a) Use solvents that are recommended by the manufacturer only.

Reference:

J&B Fundamentals 2nd edition, pages 331-334

IFSTA Essentials 5th edition, pages 478-479

PRESENTATION

ENABLING OBJECTIVE #2

The Firefighter I candidate, when given the necessary equipment, shall correctly demonstrate the procedures for inspecting and maintaining different types of fire service ground ladders.

1. Discuss with the candidates the components of a thorough ladder inspection for all types of ground ladders.
 - a) Inspect after each use and on a monthly basis.
 - b) Wood and Wood composite ladder.
 - c) Roof ladder.
 - d) Extension ladder.
 - e) Check to be sure that all required labels are intact and within expiration dates. Also be sure that the ladder conforms to NFPA 1931.
 - f) Damaged ladders that fail to meet the criteria of NFPA 1932 “Standard on Use, Maintenance, and Service Testing of Fire Department ground Ladders” must be removed from service repaired, inspected, and tested before being returned to service.
 - g) Discuss inspection and replacement of halyards and wire cables.

2. Discuss with the candidates the recommended procedures for ladder maintenance.
 - a) Keep ladders moisture free.
 - b) Do not expose ladders to vehicle exhaust.
 - c) Do not expose ladders to the weather elements for an extended period of time.
 - d) Do not paint ladders except for the top and bottom 12 inches (300 mm), and only for identification and visibility.

Reference:

Delmar Handbook 3rd edition, page 422-425.

J&B Fundamentals 2nd edition, pages 331-333

IFSTA Essentials 5th edition, pages 478-481

APPLICATION

Set up an inspection station and a cleaning station. Divide the candidates into two groups. Assign each group to a station. After all candidates have completed the assigned station, rotate the groups.

SUMMARY

Stress to the candidates that accepted maintenance and inspection procedures not only extend the life of the ladder but may also extend the life of the firefighter.

Review the inspection and maintenance procedures with the candidates.