## Fire Service Ladders

<table>
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<tr>
<th>Course</th>
<th>Rationale</th>
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<tr>
<td>Firefighter II</td>
<td>It is necessary for firefighters to understand the design, characteristics and uses of fire service ground ladders. Ladders can be used for rescue purposes as well as for firefighting. They provide access to elevated locations and are often the only means of escape from life-threatening situations. This chapter will discuss the safe and effective use of ground ladders in the fire service.</td>
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| Unit VIII | Ladders |

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<tr>
<th>Essential Question</th>
<th>Why is it important for firefighters to have an understanding of fire service ladders?</th>
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| Prior Student Learning | Firefighter I |

| Estimated Time | 8 lecture, 4 hours skills introduction and additional time to practice skills for proficiency |

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<tr>
<th>Objectives</th>
<th>The student will be able to:</th>
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<tr>
<td>1.</td>
<td>Identify the parts of a ladder</td>
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<td>2.</td>
<td>Identify different ladder types and their uses</td>
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<td>3.</td>
<td>Explain ladder inspection and maintenance procedures</td>
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<td>4.</td>
<td>Demonstrate the proper handling of ground ladders</td>
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<td>5.</td>
<td>Demonstrate the proper raising and positioning of ground ladders</td>
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<td>6.</td>
<td>Demonstrate proper climbing techniques in various fire service related circumstances</td>
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| Engage | Lead the students in a discussion pertaining to fire service tools and equipment, and how ladders fit into the equation. Ask them to list circumstances in which firefighters would need to use ladders, and what would happen if firefighters did not have ladders available at their discretion. Use the Discussion Rubric for assessment. |

<table>
<thead>
<tr>
<th>Key Points</th>
<th>I. Ladder Parts</th>
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<tbody>
<tr>
<td>A. Beam – the main structural member(s) of a ladder. They support the rungs, or rung blocks, that the rungs attach to.</td>
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<tr>
<td>B. Bed/base/main section – the lowest and widest section of an extension ladder. This section is always in contact with the ground.</td>
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<td>C. Butt, heel, or base – the bottom of the ladder that is placed on the ground.</td>
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<td>D. Butt spurs – metal plates, spikes, or cleats attached at the butt to prevent the ladder from sliding or slipping.</td>
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<tr>
<td>E. Dogs, locks, pawls – devices attached to the inside of the beams of extension ladders to hold the fly section in place after it is extended.</td>
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<tr>
<td>F. Fly section – the upper section(s) of extension ladders and some combination ladders. Fly sections are the sections that move.</td>
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<tr>
<td>G. Footpads/shoes – swivel plates attached to the butt of the ladder. They usually have rubber or neoprene bottoms.</td>
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<td>H. Guides – slots or channels on an extension ladder that hold the fly...</td>
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sections in place while they are being raised

I. Halyard – the rope or cable that is used to hoist and lower the fly sections of extension ladders

J. Heat sensor label – attached to the inside of each beam in each ladder section. By changing color, they indicate if the ladder has been exposed to excessive heat, requiring testing before further use.

K. Hooks – installed near the top end of a roof ladder to secure the ladder to the highest point on a peaked roof

L. Protection plates – pieces of metal attached to a ladder at chafing points, where the ladder may come in contact with the apparatus mounting brackets

M. Pulley – the small grooved wheel that the halyard travels on as an extension ladder is raised or lowered

N. Rails – the two lengthwise members of a truss ladder that are separated by truss or separation blocks

O. Rungs – the cross members of a ladder that the climber steps upon. The rungs extend from one beam to the other, except on pompier ladders, where the rungs run through a single beam

P. Stops – wooden or metal pieces of the ladder that prevent the fly section from being overextended

Q. Tie rods – metal rods that extend from one beam to the other to hold wooden ladders together. They are located directly beneath the rungs at different levels

R. Tip/top – the extreme tip or top of a ladder

S. Truss block – spacers set between the top and bottom rails of a trussed ladder. They sometimes support rungs

II. Ladder Types

A. Single ladders

1. Single ladders
   a) Consist of one fixed-length section
   b) Identified by their overall length
      (1) 6 to 32 feet
      (2) Most common lengths range from 12 to 24 feet.
   c) Also called
      (1) Wall ladders
      (2) Straight (wall) ladders
   d) Used for quick access to windows and roofs of one and two story buildings

2. Roof ladders
   a) Single ladders equipped with folding hooks that can anchor over the ridge of pitched roofs
   b) When in the proper position, they lie flat on the roof surface so that firefighters may work from the ladder.
   c) The ladder evenly distributes the weight of the firefighter and helps to prevent slipping.
   d) Can be used as single wall ladders
   e) Range from 12 to 24 feet in length
3. Folding ladders (Attic ladders)
   a) Single ladders that are most often used to access attics
   b) They have hinged rungs that allow the beams to rest against each other when the ladder is closed.
   c) Folding ladders range from 8 to 16 feet in length.
   d) The most common length is 10 feet.

B. Extension ladders
1. Extension ladders
   a) Have a bed or base section and one or more fly sections that extend the ladder’s length
   b) Are adjustable to the length needed to access roofs and windows
   c) Range in length from 12 to 39 feet

2. Pole ladders
   a) Extension ladders with poles attached to swivels at the top of the bed section that add leverage and stability when the ladder is being raised
   b) NFPA 1931 requires that ladders 40 feet or longer be equipped with staypoles.
   c) Pole ladders are constructed with two to four sections and most modern pole ladders are no longer than 50 feet.

C. Combination ladders
1. Are designed to be a self-supporting step ladder (A-frame), a single ladder, or an extension ladder
2. Range from 8 to 14 feet in length
3. The most popular length is 10 feet.
4. Must be equipped with positive locking devices to secure the ladder when in the open position

D. Pompier ladders
1. Often referred to as scaling ladders
2. They are single beam ladders with rungs extending through the beam, and projecting from both sides.
3. They have large metal “goosenecks” that are used to hook onto window sills or other openings.
4. Are used to climb from floor to floor, through the use of exterior windows or openings
5. Range from 10 to 16 feet in length

III. Ladder Construction (advantages and disadvantages)
A. Metal
   1. A good conductor of heat, cold, and electricity
   2. Easy to repair
   3. May fail suddenly when exposed to heat or flame
   4. Metal ladders come in the widest range of sizes

B. Wood
   1. The most expensive of all ladder types
   2. Also the heaviest per foot
   3. Retain strength when exposed to heat or flame
   4. They are very durable
C. Fiberglass
1. Are generally poor conductors of electricity
2. May suddenly crack or fail when overloaded
3. May burn when exposed to flame

IV. Ladder Inspection and Maintenance
A. Ladders must conform to NFPA 1931: they are required to have a certification label (applied by the manufacturer) verifying that the ladder meets NFPA standards
B. Maintenance
1. The difference between maintenance and repair
   a) Maintenance – keeping in a state of usefulness or readiness
   b) Repair – restore or replace what is damaged or worn out
2. Ladders must be serviced and tested
   a) Before being put into use
   b) Annually
   c) After exposure to high heat
   d) After exposure to rough treatment
3. General maintenance requirements
   a) Keep ladders free from moisture
   b) Do not expose ladders to vehicle exhaust or engine heat
   c) Do not store ladders where they will be exposed to the elements
   d) Do not paint ladders, except for the top and bottom 18 inches of the beams for the purpose of identification or visibility

V. Cleaning Ladders
A. Dirt and debris on ladders can cause them to malfunction
B. A soft bristle brush and running water are the most effective method of cleaning accumulated dirt from a ladder
C. Tar, oil, and greasy residue should be removed with mild soap and water, or solvents that are safe for the environment
D. Always wipe wet ladders dry when you finish cleaning them
E. As ladders are being cleaned, firefighters should look for damage or wear, and any defects should be dealt with according to department Standard Operating Procedures (SOPs)
F. Lubricants should be applied according to manufacturer’s specifications to allow for the proper operation of the ladder

VI. Inspection and Service Testing Ladders
A. NFPA 1932 is the standard for ground ladder testing; it requires ladders to be inspected monthly, and after each use
B. All ground ladders should be tested prior to being put into service
C. Ladder testing should be done by approved testing organizations or approved fire service personnel
D. Inspections should include:
   1. Verification of heat sensing labels (look for a change in color,
indicating heat exposure)
2. Rungs for damage and wear
3. Rungs for tightness
4. Bolts and rivets for tightness
5. Welds for cracks and/or defects
6. Beams and rungs for cracks, splintering, breaks, gouges, checks, wavy conditions, or deformation

E. Inspection of wooden ladders and ladders with wooden components
1. Ladder finishes that are chafed or scraped
2. Darkened varnish (indicates exposure to heat)
3. Dark streaks in the wood (indicates deterioration of the wood)
4. Marred, worn, cracked, or splintered parts
5. Rounded or smooth shoes
6. Water damage

F. Roof ladders
1. Make sure the roof hook assemblies operate smoothly
2. Look for signs of rust
3. Deformed hooks
4. Parts firmly attached with no signs of being loose

G. Extension ladders
1. Check the following:
   a) Pawl assemblies (hooks and fingers should move in and out freely)
   b) Halyard should be replaced if damaged
   c) Halyard cables should be taut when the ladder is bedded
   d) Make sure pulleys spin freely
   e) Make sure ladder guides are in place and that the ladder can move freely
   f) Staypole toggles and the mechanisms used for detachable staypoles should be checked to make sure that they move and operate freely

H. If any repairs are necessary, the ladder should be removed from service until it can be repaired and tested

I. Ladders that cannot be repaired need to be destroyed or scrapped for parts

VII. NFPA Requirements
A. NFPA 1901, Standard for Automotive Fire Apparatus, specifies the minimum length and types of ladders to be carried on pumper/engine companies:
   1. One roof ladder
   2. One extension ladder (recommended to be 35 feet in areas where no ladder trucks are in service)
   3. One attic ladder

B. NFPA 1901, Standard for Automotive Fire Apparatus, specifies that aerial ladders must carry the following:
   1. One 10-foot or longer attic ladder
   2. Two roof ladders that are at least 16 feet long
3. One combination ladder at least 14 feet long
4. One 24-foot or longer extension ladder
5. One 35-foot extension ladder

C. Ladder safety
   1. Choose the proper ladder for the job
   2. Wear appropriate Personal Protective Equipment (PPE) when working on a ladder
   3. Use your leg muscles when lifting ladders below the waist
   4. Do not raise ladders within 10 feet of electrical lines
   5. Place the ladder at the proper climbing angle (approximately 75 degrees)
   6. Do not overload the ladder (one firefighter every 10 feet, or one per section)
   7. Tie in with a leg lock or a ladder belt when working from a ladder
   8. Use ladders for their intended purposes
   9. Inspect ladders for damage or wear after each use

D. Selecting the proper ladder for the job
   1. Residential stories average about 10 feet, and the distance between the floor and the window averages about 3 feet
   2. Commercial stories average about 12 feet from floor to floor, and the distance between the floor and the windowsill averages 4 feet
   3. The base of the ladder should be able to be placed 1/4 of the vertical distance from the ground to where the ladder comes in contact with the wall
   4. The optimum climbing angle is approximately 75 degrees
   5. Ladders should extend three to five rungs beyond the roof edge to provide safe footing and handholds to step off the ladder.
   6. The tip of the ladder should be placed even with the top of the window and on the windward side (upwind), to gain access into narrow windows or to ventilate
   7. The ladder tip should be placed just below the windowsill to facilitate rescues

VIII. Proper Lifting and Lowering Methods
   A. Have the proper number of personnel for the job
   B. When raising a ladder bend your knees, keeping your back as straight as possible, and lift with your legs
   C. When 2 or more firefighters are lifting, the firefighter at the butt end should give the ladder commands
   D. When lowering a ladder use your leg muscles

IX. Ladder Carries
   A. One Firefighter Low-Shoulder Carry
      1. Rest the ladder’s upper beam on your shoulder, while your arm goes between two rungs (Single or Roof Ladder)
      2. Carry the butt end of the ladder in front, slightly lowered
   B. Two Firefighter Low-Shoulder Carry
1. Most commonly used for 24-, 28-, and 35-foot extension ladders
2. Allows for excellent control of the ladder
3. The forward firefighter (at the butt) places his or her free hand over the upper butt spur, in order to prevent injury if there is a collision while the ladder is being carried

C. Three Firefighter Flat-Shoulder Carry
1. Usually used on extension ladders up to 35 feet in length
2. There are two firefighters on one side of the ladder (one on each end), and a single firefighter on the opposite side of the ladder in the middle

D. Four Firefighter Flat-Shoulder Carry
1. The ladder is carried on the flat, as in the three firefighter flat-shoulder carry, except for the positioning
2. There are two firefighters on each end of the ladder, opposite each other

E. Two Firefighter Arm’s Length On-Edge Carry
1. Best performed with lightweight ladders
2. The firefighters are positioned on the bed-section of the ladder while the ladder is in a vertical position (on-edge)

F. Special Procedures for Carrying Roof Ladders
1. In some cases, a firefighter may have to carry a roof ladder tip forward, as opposed to butt forward. The firefighters will use the low-shoulder method with the hooks or tip forward
2. This occurs if the firefighters intend on climbing another ground ladder to allow them to place the roof ladder, with the hooks deployed, on a sloped roof

X. Positioning Ground Ladders
A. Responsibility for positioning
1. Officers usually choose the general location on which a ladder is to be raised
2. Personnel carrying the ladder most often decide on the exact location where the ladder will be raised
3. The firefighter at the butt end makes the decision about where to raise the ladder (If there are two firefighters at the butt end, the firefighter on the right side is responsible for choosing its placement)
4. This procedure changes from department to department. Check you department’s protocols

B. Factors affecting ladder placement
1. Ladders should always be placed properly for their intended use
2. Make sure the butt is the proper distance from the building
3. To break a window for ventilation
   a) Place the ladder alongside the window on the windward side
   b) The tip of the ladder should be even with the top of the window
c) The same method can be used to climb in and out of narrow windows, or to direct hose streams into them

4. For entry or rescue from a window
   a) Place the ladder tip slightly below the sill
   b) If the window is wide enough to permit the ladder tip to project into it, and allow entry and exit for firefighters to perform a rescue, place the ladder so that two or three rungs extend above the sill

5. Miscellaneous guidelines
   a) Place ladders at a minimum of two points on different sides of the building to allow for emergency egress if necessary
   b) Try not to place ladders over windows, doors, or other openings where the ladder may be exposed to heat or flame
   c) Take advantage of the building’s construction when placing a ladder (such as the corners)
   d) Raise the ladder directly in front of the window if you are going to use the ladder to support a smoke ejector. Place the ladder tip on the wall directly above the window opening
   e) Don’t place ladders where there are overhead obstructions
   f) Try not to place ladders on uneven terrain
   g) Avoid placing ladders in avenues of egress; attempt to place ladders to the side of openings where firefighters need to gain entry, or where evacuation may occur
   h) Avoid heat and flames whenever possible
   i) Don’t place ladders on top of trapdoors, grates, or manholes that are located on sidewalks or streets
   j) The desired angle of inclination is approximately 75 degrees
   k) Proper distance between the heel of the ladder and the building can be determined by dividing the length of the ladder used by 4

XI. Securing the Ladder
   A. For safety, ladders must be secure before firefighters climb or work on them
      1. On extension ladders
         a) Make sure the ladder locks are locked
         b) Tie the halyard with a clove hitch and an overhand safety knot
      2. Prevent movement of the ladder by tying the ladder in, or by heeling the ladder
   B. Several methods for heeling a ladder
      1. Underneath the ladder method
         a) Stand beneath the ladder with feet shoulder’s width apart, and one foot slightly in front of the other
         b) Grasp the beams at about eye level and then pull backward, pulling the ladder against the building
c) Wear head and eye protection
d) Do not look up as someone climbs the ladder
e) Grasp the beams and not the rungs
f) Be aware of the potential for falling objects

2. Outside the ladder method
   a) Stand on the outside of the ladder and chock or secure the ladder with one foot placed against the beam at the butt or on the bottom rung
   b) Grasp the beams with your hands and press the ladder against the building
   c) Stay alert for firefighters coming down the ladder

3. Tying in
   a) Tie the ladder securely to an object whenever possible, to prevent it from slipping or pulling away from the building
   b) Use a hose, rope, tool, or strap to secure it
   c) This frees you from having to stay with the ladder to secure it

XII. Climbing and descending ladders
   A. Should be done smoothly, with as little bounce or sway as possible
   B. Keep knees bent to ease the weight onto each rung and aid in making the climb or descent smooth
   C. Keep your body perpendicular to the ground to help maintain balance
   D. Keep your eyes focused forward, occasionally looking at the tip of the ladder
   E. Keep your arms straight (horizontal) during the climb to keep your body away from the ladder and allow for freedom of movement
   F. Keep your hands on the rungs, palms down with thumbs under the rung, when not carrying equipment
   G. Grasp alternate rungs while climbing
   H. Coordinate your hand and foot movements so that your right hand and left foot are in contact with the ladder as you move your left hand and right foot to the next rungs
   I. Use your leg muscles to push yourself upward
   J. Do not reach your arms and hands above your head while climbing, to maintain adequate space between your body and the ladder
   K. Develop form as you practice; speed comes with repetition
   L. If you are required to carry equipment as you climb, slide your free hand under a beam as you climb maintaining constant contact with the ladder, and hoist tools and equipment whenever possible

XIII. Working From a Ladder
   A. Firefighters must work with both hands while working from a ladder
   B. Use a ladder belt or leg lock to make sure both hands are free to work
   C. If a ladder belt is used, it should be securely tightened around the waist and attached to a rung
D. A leg lock can be used to secure a firefighter to a ladder, with the leg opposite the side of the ladder your hands are working on.

XIV. Assisting Victims Down Ladders
A. Ladder placement
   1. Rescue from a window requires the ladder to be placed just below the sill.
   2. To bring victims down a ladder, at least four firefighters are needed:
      a) Two inside the building
      b) One or two on the ladder
      c) One heeling the ladder
B. Conscious victims can be lowered feet-first (facing the building) onto the ladder.
C. An unconscious victim can be held on the ladder the same way as a conscious victim, with the victim’s weight resting on the rescuer’s knee:
   1. The victim’s feet are placed outside the rails.
   2. The rescuer must grasp the rungs to provide a secure hold on the ladder, and to help prevent the victim’s head from hitting the ladder.
   3. The unconscious victim can also be turned around, facing the rescuer to reduce the chance of the victim’s limbs catching on the rungs.
   4. The victim’s weight is supported at the crotch by one of the rescuer’s arms and at the chest by the other arm.
   5. Extraordinarily heavy victims will require two rescuers:
      a) Two ground ladders are placed side-by-side
      b) One rescuer supports the victim’s waist and legs
      c) The second rescuer supports the victim’s head and upper torso.
D. Small children may be brought down a ladder cradled across the rescuer’s arms.

Activities
Provide a ladder, for demonstration purposes, to complete the following activities:
1. Review all parts of a ladder using the Ladder Components Worksheets.
2. Demonstrate the following skills and have the students use skills sheets for practice:
   a. Tying a halyard
   b. One firefighter low-shoulder carry
   c. Heeling a ladder from the outside and underneath
   d. Raise and lower a ladder
   e. Deploy a roof ladder
   f. Assist a conscious victim down the ladder.

Assessments
Fire Service Ladders Quiz and Key
Assist a Conscious Victim Method Checklist
Deploy a Roof Ladder One Firefighter Method Checklist
Heeling the Ladder from the Outside Checklist
Heeling the Ladder from Underneath Checklist
One Firefighter Low-Shoulder Carry Checklist
Raise and Lower a Ladder One Firefighter Method Checklist
Tie a Halyard Checklist
Discussion Rubric

Materials
Fire Service Ladders computer-based presentation
Fire Service Ladder Components Worksheet 1a
Fire Service Ladder Components Worksheet 1b
14-foot straight wall ladder or roof ladder
24-foot extension ladder

Resources
1418001775, Introduction to Fire Protection (3rd Edition), Klinoff, Robert
0135151112, Essentials of Firefighting (5th Edition), International Fire
Service Training Association (IFSTA)

Accommodations for Learning Differences
For reinforcement, students will participate in peer mentoring and document
the parts of the ladder in a vocabulary journal.
For enrichment, students will practice additional ladder methods.

State Educational Standards
Texas Essential Knowledge and Skills for Career and Technical Education
130.300 Firefighter II (Two to Three Credits).
(4) The student explains the purpose of the National Fire Protection
Association standards applicable to fire service ladders. The student is
expected to:
(A) Identify the materials used in ladder construction and the features;
(B) Describe and demonstrate inspection and maintenance procedures
for different types of ground ladders;
(C) Identify the load capacities for ground ladders;
(D) Select a ladder for a given task;
(E) Demonstrate raising and positioning ground ladders;
(F) Describe and demonstrate securing a ground ladder;
(G) Explain proper ladder climbing techniques while transporting tools
and equipment or assisting a person with a simulated injury;
(H) Demonstrate proper ladder climbing techniques while transporting
tools and equipment or assisting a person with a simulated injury; and
(I) Demonstrate the deployment of a roof ladder on a pitched roof.

College And Career Readiness Standards
English Language Arts
IV. Listening
   B. Listen effectively in informal and formal situations
      1. Listen critically and respond appropriately to presentations.
      2. Listen actively and effectively in one-on-one situations
      3. Listen actively and effectively in group discussions.
Ladder Types and Components Worksheet 1a
(Images used with permission from IFSTA.)

1. __  
2. __  
3. __  
4. __  
5. __  
6. __  
7. __  
8. __  
9. __  
10. __  
11. __  
12. __  
13. __ 

A. Rungs  
B. Beams  
C. Butt  
D. Truss Block  
E. Single Ladder  
F. Hooks closed  
G. Butt Spurs  
H. Hooks open  
I. Rails  
J. Roof Ladder  
K. Heat Sensor Label  
L. Tip  
M. Truss Ladder
Ladder Components Worksheet 1a Key
(Images used with permission from IFSTA.)

1. E
2. L
3. H
4. F
5. J
6. A
7. M
8. D
9. I
10. B
11. C
12. G
13. K

N. Rungs
O. Beams
P. Butt
Q. Truss Block
R. Single Ladder
S. Hooks closed
T. Butt Spurs
U. Hooks open
V. Rails
W. Roof Ladder
X. Heat Sensor Label
Y. Tip
Z. Truss Ladder
Ladder Types and Components Worksheet 1b
(Images used with permission from IFSTA.)

1. ___
2. ___
3. ___
4. ___
5. ___
6. ___
7. ___
8. ___
9. ___
10. ___
11. ___
12. ___
13. ___
14. ___
15. ___

A. Pulley
B. Halyard Cable
C. Fly Section
D. Bed Section
E. First Fly Section
F. Halyard Rope
G. Foot pad (inside)
H. Foot pad (outside)
I. Ladder Pawl
J. Rungs (single beam)
K. Rungs (two beams)
L. Two Section Extention Ladder
M. Three Section Extention Ladder
N. Second Fly Section
O. Protection Plates
Ladder Types and Components Worksheet 1b Key
(Images used with permission from IFSTA.)

1. K
2. O
3. N
4. J
5. A
6. B
7. E
8. I
9. C
10. H
11. D
12. F
13. G
14. L
15. M

A. Pulley
B. Halyard Cable
C. Fly Section
D. Bed Section
E. First Fly Section
F. Halyard Rope
G. Foot pad (inside)
H. Foot pad (outside)
I. Ladder Pawl
J. Rungs (single beam)
K. Rungs (two beams)
L. Two Section
   Extention Ladder
M. Three Section
   Extention Ladder
N. Second Fly Section
O. Protection Plates
Fire Service Ladders Quiz

1. _____ The main structural members of a ladder are the_____.  
   a. Trusses  
   b. Beams  
   c. Rungs  
   d. Rails

2. _____ The lowest or widest section of an extension ladder is called the ____ section.  
   a. Bed  
   b. Base  
   c. Main  
   d. All of the above

3. _____ What prevents the fly section of an extension ladder from being overextended?  
   a. Stops  
   b. Locks  
   c. Guides  
   d. Truss blocks

4. _____ The bottom of the ladder that is placed on the ground is called the _____.  
   a. Bed  
   b. Beam  
   c. Butt  
   d. Base

5. _____ What are the slots or channels on an extension ladder that hold the fly sections in place after it has been extended?  
   a. Stops  
   b. Guides  
   c. Rails  
   d. Pawls

6. _____ The most common length of single ladders is:  
   a. 8 to 16 feet  
   b. 12 to 39 feet  
   c. 12 to 24 feet  
   d. 6 to 32 feet

7. _____ Which of the following ladders have one or more fly sections?  
   a. Single  
   b. Roof  
   c. Extension  
   d. Combination
8. ______Combination ladders range from ___ to ___ feet in length.
   a. 8 to 14
   b. 10 to 16
   c. 12 to 24
   d. 6 to 32

9. ______Most modern pole ladders are no longer than ___ feet in length.
   a. 35
   b. 40
   c. 45
   d. 50

10.______NFPA 1931 requires that ladders ___ feet and longer be equipped with staypoles.
    a. 35
    b. 40
    c. 45
    d. 50

11.______Which of the following ladder construction types is generally a poor conductor of electricity?
    a. Metal
    b. Wood
    c. Fiberglass
    d. All fire service ladder construction types are generally poor conductors of electricity.

12.______Which ladder construction type is the heaviest per linear foot?
    a. Metal
    b. Wood
    c. Fiberglass
    d. All fire service ladder construction types weigh about the same per linear foot.

13.______ “Keeping in a state of usefulness or readiness” best defines:
    a. Maintenance
    b. Repair
    c. Upkeep
    d. All of the above

14.______ “To restore or replace what is damaged or worn out” best defines:
    a. Maintenance
    b. Repair
    c. Upkeep
    d. None of the above

15.______NFPA ____ is the standard for ground ladder testing.
16. _____NFPA 1901 recommends that pumpers or engines carry a ___ foot extension ladder in areas where no ladder trucks are in service.
   a. 24
   b. 28
   c. 35
   d. 50

17. _____Residential stories average about ___ feet.
   a. 10
   b. 12
   c. 15
   d. 18

18. _____Commercial stories average about ___ feet.
   a. 10
   b. 12
   c. 15
   d. 18

19. _____The three firefighter flat-shoulder carry is usually used on extension ladders up to ___ feet in length.
   a. 35
   b. 40
   c. 45
   d. 50

20. _____When climbing a ladder, the desired angle of inclination is ____ degrees
   a. 35
   b. 45
   c. 55
   d. 75
Fire Service Ladders Quiz Key

1. B
2. D
3. A
4. C
5. D
6. C
7. C
8. A
9. D
10. B
11. C
12. B
13. A
14. B
15. D
16. C
17. A
18. B
19. A
20. D
## Fire Service Ladders Checklist
### Assist a Conscious Victim Method

**Directions**
The instructor will set up a scenario with a victim and a firefighter in a building. The ladder will be positioned, secured, and heeled. When the instructor says, “Start,” climb the ladder appropriately and demonstrate the steps below. The skill ends when you state that you have completed all of the identified steps.

<table>
<thead>
<tr>
<th>Task steps</th>
<th>1 pt. each</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firefighter in the building</strong></td>
<td></td>
</tr>
<tr>
<td>Lower the victim from the window to the rescuer feet-first (facing the building) onto the ladder</td>
<td></td>
</tr>
<tr>
<td><strong>Rescuer</strong></td>
<td></td>
</tr>
<tr>
<td>Position the victim for carrying (feet-first and facing the building)</td>
<td></td>
</tr>
<tr>
<td>Descend the ladder supporting the victim</td>
<td></td>
</tr>
<tr>
<td><strong>Total points possible 3</strong></td>
<td></td>
</tr>
</tbody>
</table>

---

**Instructor’s Signature**  
**Date**
Fire Service Ladders Checklist
Deploy a Roof Ladder One Firefighter Method

Directions
Demonstrate the below steps when the instructor says, “Start.” The skill ends when you state that you have completed all of the identified steps.

<table>
<thead>
<tr>
<th>Task steps</th>
<th>1 pt. each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set the roof ladder down</td>
<td></td>
</tr>
<tr>
<td>Open the hooks and face them outward</td>
<td></td>
</tr>
<tr>
<td>Tilt the roof ladder up so that it rests against the other ladder</td>
<td></td>
</tr>
<tr>
<td>Climb the main ladder until your shoulder is about two rungs above the midpoint</td>
<td></td>
</tr>
<tr>
<td>Reach through the rungs</td>
<td></td>
</tr>
<tr>
<td>Hoist the ladder onto your shoulder</td>
<td></td>
</tr>
<tr>
<td>Climb to the top of the ladder</td>
<td></td>
</tr>
<tr>
<td>Lock into the ladder using a leg lock or life safety harness</td>
<td></td>
</tr>
<tr>
<td>Take the roof ladder off of your shoulder</td>
<td></td>
</tr>
<tr>
<td>Use a hand-over-hand method to push it onto the roof with the hooks pointed away</td>
<td></td>
</tr>
<tr>
<td>Push the roof ladder up the roof until the hooks go over the roof peak and catch solidly</td>
<td></td>
</tr>
</tbody>
</table>

Total points possible 11

Instructor’s Signature

Date
Fire Service Ladders Checklist
Heeling the Ladder from the Outside

Directions
With a raised ladder, demonstrate the proper method of heeling a ladder from the outside. Begin when instructor says, “Start.” The skill ends when you state that you have completed all of the identified steps.

<table>
<thead>
<tr>
<th>Task steps</th>
<th>1 pt. each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbalizes that the ladder is safe for climbing and the overhead is clear of obstructions</td>
<td></td>
</tr>
<tr>
<td>Ensures that the helmet is secure and the face shield is down</td>
<td></td>
</tr>
<tr>
<td>Stands on the outside of the ladder, centered between the ladder beams</td>
<td></td>
</tr>
<tr>
<td>Places one foot upon the bottom rung or a ladder heel and, with both hands, grasps the ladder beams</td>
<td></td>
</tr>
<tr>
<td>Presses the ladder against the building while staying alert for descending personnel and falling objects</td>
<td></td>
</tr>
</tbody>
</table>

Total points possible 5

Instructor’s Signature  Date
Fire Service Ladders Checklist
Heeling the Ladder from Underneath

Directions
With a raised ladder you will demonstrate the proper method of heeling a ladder from underneath. You will begin on my instruction to start. The skill will end when you state to me that you have completed all of the identified steps. Do you understand these instructions?

<table>
<thead>
<tr>
<th>Task steps</th>
<th>1 pt. each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbalizes that the ladder is safe for climbing and the overhead is clear of obstructions</td>
<td></td>
</tr>
<tr>
<td>Ensures that the helmet is secure and the face shield is down</td>
<td></td>
</tr>
<tr>
<td>Stands underneath the ladder with one-foot in front of the other for stability</td>
<td></td>
</tr>
<tr>
<td>Grasps the ladder beams with the hands, just beneath the rungs</td>
<td></td>
</tr>
<tr>
<td>Pulls backward and applies constant pressure to hold the ladder against the building, while looking straight ahead</td>
<td></td>
</tr>
</tbody>
</table>

Total points possible 5

Instructor’s Signature

Date
Fire Service Ladders Checklist
One Firefighter Low-Shoulder Carry

Directions
Begin when the instructor says, “Start.” The skill will end when you state that you have completed all of the identified steps below.

<table>
<thead>
<tr>
<th>Task steps</th>
<th>1 pt. each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position yourself at the lifting point near the center of the ladder</td>
<td></td>
</tr>
<tr>
<td>Kneel beside the ladder</td>
<td></td>
</tr>
<tr>
<td>Grasp the ladder rung opposite your knee</td>
<td></td>
</tr>
<tr>
<td>Stand the ladder on edge</td>
<td></td>
</tr>
<tr>
<td>Stand up while holding the ladder</td>
<td></td>
</tr>
<tr>
<td>Reposition yourself for carrying by pivoting toward the ladder tip and inserting your other arm through the rungs</td>
<td></td>
</tr>
<tr>
<td>Position the ladder for carrying with the tip lowered slightly</td>
<td></td>
</tr>
<tr>
<td>Lower the ladder to the ground</td>
<td></td>
</tr>
<tr>
<td><strong>Total points possible 5</strong></td>
<td></td>
</tr>
</tbody>
</table>

Instructor’s Signature  Date
Fire Service Ladders Checklist
Raise and Lower a Ladder One Firefighter Method

Directions
Demonstrate the steps below when the instructor says, “Start.” The skill ends when you state that you have completed all of the identified steps.

<table>
<thead>
<tr>
<th>Task steps</th>
<th>1 pt. each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set the ladder down with the butt to the ground and the butt spurs against the wall</td>
<td></td>
</tr>
<tr>
<td>Position yourself to raise the ladder</td>
<td></td>
</tr>
<tr>
<td>Bring the ladder upright using the hand-over-hand method</td>
<td></td>
</tr>
<tr>
<td>After it rests against the building, move the ladder butt out to the desired angle</td>
<td></td>
</tr>
<tr>
<td>Lower the ladder, reversing the procedure</td>
<td></td>
</tr>
</tbody>
</table>

**Total points possible 5**

Instructor’s Signature  Date
Fire Service Ladders Checklist
Tie a Halyard

Directions
With a raised extension ladder and a sufficient halyard for tying, take the excessive halyard using an acceptable method, and tie the halyard to a rung as a safety method to prevent the fly section(s) from slipping and to keep anyone from tripping over it. Begin when the instructor says, “Start.” The skill will end when you state that you have completed all of the identified steps.

<table>
<thead>
<tr>
<th>Task steps</th>
<th>1 pt. each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbalizes overhead clear of obstruction</td>
<td></td>
</tr>
<tr>
<td>Wraps the excess halyard around two convenient rungs, pulling the halyard taut</td>
<td></td>
</tr>
<tr>
<td>Ties a clove hitch knot around the rung and halyard</td>
<td></td>
</tr>
<tr>
<td>Finishes the tie by making a half hitch or overhand safety knot on the top or bottom of the clove hitch</td>
<td></td>
</tr>
<tr>
<td>Places any excess halyard behind the ladder so it does not interfere with climbing, and verbalizes that the ladder is safe for climbing</td>
<td></td>
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</tbody>
</table>

Total points possible 5

Instructor’s Signature Date
## Discussion Rubric

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Participates in group discussion</td>
<td></td>
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<tr>
<td>Encourages others to join the conversation</td>
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</tr>
<tr>
<td>Keeps the discussion progressing to achieve goals</td>
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<tr>
<td>Shares thoughts actively while offering helpful recommendations to others</td>
<td></td>
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<tr>
<td>Gives credit to others for their ideas</td>
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<tr>
<td>Respects the opinions of others</td>
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<tr>
<td>Involves others by asking questions or requesting input</td>
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<tr>
<td>Expresses thoughts and ideas clearly and effectively</td>
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</tbody>
</table>

**Total Points (32 pts.)**

**Comments:**