

Module: Health and Wellness

Description

This module prepares students to have a long and healthy career performing the duties of a firefighter. Work in the Fire Service demands high levels of physical fitness. Health-related problems are a leading cause of Line-of-Duty Deaths (LODD). This module provides students with an awareness of the physical nature of firefighter training and the knowledge to build and maintain fitness to ensure their safety and the safety of the people who will count on them.

Module Outcome

At the end of this module, the Firefighter I student will understand their own level of physical fitness and ability to perform the essential job tasks of firefighting by completing strength, flexibility, and cardiorespiratory assessments, and developing a nutrition and hydration plan to support them throughout the duration of training.

Standards

This module aligns with applicable standards in:

- NFPA 1010 *Standard on Professional Qualifications for Firefighters* (2024)
- NFPA 1500 *Standard on Fire Department Occupational Safety, Health, and Wellness Program* (2021)
- NFPA 1583 *Standard on Health-Related Fitness Programs for Fire Department Members* (2021)
- NFPA 1584 *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises* (2022)

This module directly supports one Job Performance Requirements (JPR) from NFPA 1010.

Table 1: Module Standards NFPA 1010 (2024) Standard on Professional Qualifications for Firefighters Chapter 6 — Firefighter I (NFPA 1001)	
Standard	Requisite Knowledge or Skills
6.1.1 General Knowledge Requirements.	<ul style="list-style-type: none"> • The importance of physical fitness and a healthy lifestyle to the performance of the duties of a firefighter; • the critical aspects of NFPA 1500.

The NFPA defines requisite knowledge and requisite skills as the minimum a student needs to know and be able to do in order to accomplish the task defined in the JPR.



Notes

Instructors teaching this module should have sufficient knowledge and experience with the subject matter to answer questions appropriately and guide students within the limits of the module.

A number of professional organizations, including those listed in the table below, provide training and educational experiences as well as certification programs for interested persons. It is in the best interests of fire departments to avail themselves of these professional services as time and resources allow. (NFPA 1583 **A.5.2.1**)

NFPA 1583 Table A.5.2.1 Professional Organizations Providing Training

Organization	Training Program
American College of Sports Medicine (ACSM)	Personal Trainer, Health and Fitness Instructor, Exercise Specialist
American Council on Exercise (ACE)	Personal Trainer
International Association of Fire Fighters (IAFF)/International Association of Fire Chiefs (IAFC)/American Council on Exercise (ACE)	Peer Fitness Trainer (PFT)
National Strength and Conditioning Association (NSCA)	Certified Strength and Conditioning Specialist (CSCS), Certified Personal Trainer (CPT), or Tactical Strength and Conditioning (TSAC) Facilitator
National Academy of Sports Medicine (NASM)	Personal Trainer

Instructors conducting the practical components of this module should have a background in functional anatomy, exercise physiology, biomechanics, movement observation and assessment, fitness testing, exercise programming, coaching, and leadership.

A minimal level of certification (IAFF/IAFC/ACE Peer Fitness Trainer [PFT]) can be obtained from American Council on Exercise (ACE) as recommended by the IAFF/IAFC *Wellness-Fitness Initiative*. (NFPA 1583 **A.5.3.3**)

There are no broadly accepted educational standards for health and fitness personnel in the United States. While it would be an unrealistic and unattainable goal to require that all health and fitness instructors have a baccalaureate or graduate degree in a related discipline, it is important to note the level of formal training such a degree connotes. (NFPA 1583 **A.5.2**)

Module Learning Objectives

By the end of this module, Firefighter I students will:

Table 2: Learning Objectives
Module: Health and Wellness

ID	Objective	Alignment
LO1	Describe the physical demands of firefighting, given the essential job tasks listed in NFPA 1500, so that the correlation between general health and occupational injury is recognized.	6.1.1
LO2	Develop a nutrition plan, given information on firefighter nutritional needs, dietary guidelines, and examples of meal planning for high-performance demands, so that dietary choices support sustained energy, recovery, and long-term health.	6.1.1
LO3	Develop a hydration plan, given information on hydration requirements, the effects of dehydration on performance and safety, and strategies for maintaining fluid balance in training and emergency operations, so that signs of dehydration are recognized, effective hydration strategies are implemented, and optimal physical performance is sustained.	6.1.1
LO4	Demonstrate aerobic capacity, given an aerobic capacity assessment, so that high-intensity physical activity is sustained, and recovery is safely achieved.	6.1.1
LO5	Demonstrate musculoskeletal strength, given strength assessments based on firefighting tasks, so that essential job functions are safely performed, injury risk is reduced, and the physical demands of firefighting operations are met.	6.1.1
LO6	Demonstrate cardiovascular endurance, given endurance assessments based on firefighting tasks, so that prolonged physical exertion is sustained during fireground operations without undue fatigue, and risk of cardiovascular injury is reduced.	6.1.1
LO7	Demonstrate flexibility, given flexibility and mobility assessments related to firefighting movements, so that tasks requiring full range of motion are performed, injury risk is reduced, and functional movement efficiency is improved.	6.1.1

Prerequisites

Students participating in this module must have a valid medical release. Students should be evaluated by a physician and deemed fit for duty within 12 months of this module.

Connections to Other Learning

This module supports nearly every other module due to the central role of physical fitness in performing and sustaining the level of work required by firefighting duties.

The knowledge in this module specifically supports the following standards in other modules:

**Table 3: Connections to Supported Standards
 NFPA 1010 (2024) Standard on Professional Qualifications for Firefighters
 Chapter 6 — Firefighter I (NFPA 1001)**

Standard	Requirement
6.3.1 Use self-contained breathing apparatus (SCBA) during emergency operations	<ul style="list-style-type: none"> An individual's VO_{2max} will significantly influence their air consumption rate.
6.3.4 Force entry into a structure	<ul style="list-style-type: none"> An individual's ability to generate force using hand tools will determine their ability to accomplish tasks.
6.3.9* Conduct a search and rescue in a structure operating as a member of a team	<ul style="list-style-type: none"> An individual's endurance and cardiorespiratory fitness will determine their ability to perform work over an extended period of time.
6.3.10* Attack an interior structure fire operating as a member of a team	<ul style="list-style-type: none"> An individual's general level of fitness will significantly their ability to do heavy work in high-heat environments.

Principles of health and wellness appear again when students come back for higher level training and education. Concepts of this module are integrated into many of the technical rescue programs.

Boundaries of Instruction and Assessment

While it is acknowledged that Firefighting is an inherently dangerous occupation where lives are lost annually due to problems related to health and fitness, this module is not designed to eliminate students from a training program. Instructors should be primarily focused on impressing the importance of health, wellness, and physical fitness, providing accurate measurement of current health and fitness levels, and basic information on improving or sustaining health and fitness.

Instructors should not teach health and fitness practices beyond the scope of this curriculum and should only recommend practices based in current science and validated through any of organizations listed above.

Module Assessments

The following skills are required to be taught and practiced during this module. These skills should be evaluated through formative assessment during instruction.

Table 4: Formative Assessments Module: Health and Wellness			
ID	Description of Skill	Standard	Description of Assessment
FA-01	Body composition	NFPA 1582 8.1	Students will estimate body composition by using waist-to-hip circumference ratio (WHR) and body mass index (BMI).
FA-02	Aerobic capacity	NFPA 1582 8.2.2 WFI Manual	Students will estimate $\dot{V}O_{2max}$ using a validated submaximal assessment protocol. Note: Students must have a medical release to perform this assessment. See notes below for safety considerations.
FA-03	Power	NFPA 1582 A.8.2.3 WFI Manual	Students will estimate their ability to generate high forces while moving the body quickly through a range of motion using a vertical jump protocol.
FA-04	Strength and Endurance	NFPA 1582 A.8.2.3 WFI Manual ASCM Guidelines	Students will evaluate cardiorespiratory endurance and musculoskeletal strength by performing cardiorespiratory and musculoskeletal assessment protocols.
FA-05	Mobility and Flexibility	NFPA 1582 A.8.2.3 WFI Manual ASCM Guidelines	Students will evaluate the mobility and flexibility of their upper and lower extremities by performing two prescribed flexibility and mobility assessment protocols.
FA-06	Plan a Meal	NFPA 1584 4.2.3	Students will use training aids to plan a meal.

i **Notes**

General indications for stopping an exercise test include:

- Onset of chest pain
- Shortness of breath, wheezing, leg pain or cramps (claudication)
- Signs of poor perfusion: light-headedness, confusion, pallor, cyanosis, nausea, cold and clammy skin, or loss of balance or coordination (ataxia)
- Drop in systolic blood pressure of 10 mmHg or more during the test
- Rise in systolic blood pressure to 250 mmHg or more or diastolic blood pressure to 115 mmHg or more
- Failure of hear rate to increase with exercise
- Noticeable change in heart rhythm
- Individual requests to stop
- Physical or verbal manifestations of severe fatigue
- Failure of testing equipment.

(Adapted from *ASCM Guidelines for Exercise Testing and Prescription, 11th Edition, 2021*)

i **Notes**

Before collecting anthropometric and performance data the instructor must be trained in the techniques and have demonstrated reliability in obtaining measurements.

The following criteria must be assessed during summative assessment and certification testing.

Table 5: Summative Assessments
Module: Health and Wellness

Standards Assessed	Description of Assessment
There are no summative assessments for this module.	

Preparation, Materials, and Resources

Student Preparation

Students should review the relevant materials in their assigned textbook and view the exercise demonstration videos in the Online Skills Academy.

Instructor Preparation

- Review *Fire Service Joint Labor Management Wellness-Fitness Initiative (WFI) Manual, 4th Edition*

- ASCM Guidelines for Exercise Testing and Prescription, 11th Edition

Materials and Resources

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Key Terms

1. **Term.** Definition. (Reference)

Revision History

The following table is provided as a quick reference.

Table 6: Revision History	
Module: Health and Wellness	
Revision Date	Revision Description
	<p>This module correlates with the Health and Wellness module of the 2019 curriculum.</p> <ol style="list-style-type: none"> 2. The physical assessment has been overhauled to align with NFPA standards and the recommendations of IAFF and IAFC Joint Labor Management Wellness-Fitness Initiative. The goal of this revision was to provide accurate and reliable quantitative data from student performance that can be correlated to performance later in the course.

Module Outline

Module: Health and Wellness	
Block 1: Introduction to Health and Fitness	
Lesson 1: Demands of Firefighting (-- minutes)	
Learning Objectives LO1 Describe the physical demands of firefighting	
Enabling Learning Objectives 1. Identify the essential job tasks of firefighting (LO1)	
Content Outline	Resources
<ul style="list-style-type: none"> ▪ Firefighter Physical Demands <ul style="list-style-type: none"> • Why understanding physical demands is important • Impact of these demands on firefighter health, injury rates, and career longevity ▪ The Essential Job Tasks of Firefighting <ul style="list-style-type: none"> • Wearing personal protective equipment (PPE) and self-contained breathing apparatus (SCBA) while performing firefighting tasks • Wearing the respirators required by the jurisdiction • Exposure to toxic fumes, irritants, particulates, biological and nonbiological hazards, or heated gases • Climbing at least six flights of stairs while wearing PPE and SCBA, commonly weighing 40–50 lb and carrying equipment/tools weighing an additional 20–40 lb • Wearing PPE and SCBA that is encapsulating and insulated, which will result in significant fluid loss • Working alone while wearing PPE and respirators required by the jurisdiction, searching, finding, and rescue-dragging or carrying victims to safety in hazardous conditions and low visibility • Advancing water-filled hose lines approximately 150 ft, which can involve negotiating multiple flights of stairs, ladders, and other obstacles • Climbing ladders, operating from heights, walking or crawling in the dark along narrow and uneven surfaces that might be wet or icy, and operating in proximity to electrical power lines or other hazards • Unpredictable, prolonged periods of extreme physical exertion as required by emergency operations without benefit of a warm-up period, scheduled rest periods, meals, access to medication(s), or hydration 	<p>Activities</p> <ul style="list-style-type: none"> ▪ <p>Materials</p> <ul style="list-style-type: none"> ▪ <p>Facilities</p> <ul style="list-style-type: none"> ▪ <p>Notes The content of this lesson is based on training requirements outlined in NFPA 1582 5.1.1.</p>

Module: Health and Wellness

Block 1: Introduction to Health and Fitness

- Operating fire apparatus or other vehicles in an emergency mode with emergency lights and sirens
- Critical, time-sensitive, complex problem solving during physical exertion in stressful, hazardous environments, including hot, dark, tightly enclosed spaces, that is further aggravated by fatigue, flashing lights, sirens, and other distractions
- Ability to communicate while wearing PPE under conditions of high background noise, poor visibility, and drenching
- Functioning as an integral component of a team, where sudden incapacitation can result in mission failure or in risk of injury or death to members of the public or other team members
- Working in shifts, including during nighttime, that can extend beyond 12 hours
- Performing EMS tasks, such as CPR or lifting or moving patients, while wearing PPE and respirators
- Summary
 - Recap major physical stressors
 - Connect how understanding these demands informs fitness and injury prevention

Lesson 2: Nutrition

(-- minutes)

Learning Objectives

LO2 Maintain adequate nutrition

Enabling Learning Objectives

1. Describe how nutrition impacts energy levels, endurance, cognitive function, and injury prevention
2. Identify common dietary challenges firefighters face
3. Explain the function of protein, carbohydrates, and fats in sustaining energy, muscle recovery, and performance
4. Determine caloric needs based on activity levels
5. Explain the importance of meal timing
6. Develop strategies for maintaining a balanced diet
7. Identify meal and snack options that support on-duty performance

Content Outline

- The Role of Nutrition in Performance
 - The impact of nutrition on energy levels, endurance, cognitive function, and injury prevention.
 - Common dietary challenges for firefighters

Resources

Activities

Materials

Module: Health and Wellness

Block 1: Introduction to Health and Fitness

- shift work
- irregular meals
- dehydration risks
- Nutritional Needs
 - Macronutrients
 - Protein for muscle repair and recovery.
 - Carbohydrates for sustained energy and glycogen replenishment.
 - Healthy fats for long-term energy and inflammation control.
 - Micronutrients
 - Vitamins
 - Minerals (electrolytes)
- Body Composition
 - Excess body fat, especially surrounding the abdominal organs, is associated with chronic conditions
 - High blood pressure (hypertension)
 - Metabolic syndrome
 - Type II diabetes
 - Stroke
 - Cardiovascular disease
 - High cholesterol (hyperlipidemia)
 - Body composition is the relative proportion of body mass that is fat.
 - Body Mass Index (BMI)
 - Relationship between height and weight
 - $\text{Weight} \times \text{height in meters squared}$
 - 18.5-24.9 $\text{kg} \cdot \text{m}^2$ is considered “normal”
 - Can give false readings for short and muscular people.
 - Accurate enough for general information
 - Waist to Hip Ratio (WHR)
 - Used to indicate distribution of fat
 - $\text{Waist measurement} \div \text{Hip measurement}$
 - Scores vary for men and women, but 80-90 is generally considered Low Risk
 - A high score may indicate that there is more fat around the abdominal organs.
- Dietary Guidelines for High-Performance Demands
 - General caloric needs based on activity levels.
 - Meal timing
 - Managing hydration and electrolyte balance before, during, and after calls.

Facilities

- Notes

Module: Health and Wellness

Block 1: Introduction to Health and Fitness

- Addressing the challenges of shift work eating patterns
 - meal spacing
 - avoiding processed foods
- Meal Planning
 - Pre-shift meals for sustained energy.
 - On-duty meal/snack options that are quick, portable, and nutrient-dense.
 - Post-shift recovery meals to aid muscle repair and rehydration.
 - Firehouse cooking culture and healthy group meals.
 - Managing fast food and convenience eating while on duty
- Summary
 - Recap the key nutritional strategies for firefighting performance
 - Reinforce the connection between nutrition, recovery, and long-term health

Lesson 3: Hydration

(-- minutes)

Learning Objectives

LO3 Maintain adequate hydration

Enabling Learning Objectives

1. Describe the physiological functions of water in the body, including temperature regulation and cardiovascular efficiency.
2. Explain how hydration impacts strength, endurance, cognitive function, and decision-making during emergency operations.
3. Recognize early and advanced signs of dehydration, including physical, cognitive, and behavioral symptoms.
4. Explain how dehydration increases the risk of heat-related illnesses, cardiac events, and impaired situational awareness.
5. Describe how PPE and environmental factors contribute to fluid loss and dehydration risk.
6. Identify recommended daily water intake for firefighters under normal and extreme conditions.
7. Identify risks associated with excessive intake of beverages that should be avoided.
8. Develop a hydration plan that accounts for pre-shift, during-shift, and post-shift fluid intake.
9. Identify methods to monitor hydration.
10. Implement corrective actions when signs of dehydration are recognized.

Module: Health and Wellness

Block 1: Introduction to Health and Fitness

Content Outline

- Hydration and Firefighter Performance
 - Importance of hydration for firefighters
 - Overview of hydration's impact on physical performance, cognitive function, and safety
 - NFPA 1584 guidelines on firefighter hydration and nutrition
- Physiological Functions of Water in the Body
 - Role of sweating and heat dissipation
 - Maintaining blood volume and circulation
 - Preventing cramps, fatigue, and performance decline
 - Effects on decision-making and reaction time
- Effects of Dehydration on Firefighter Safety and Performance
 - Signs of dehydration
 - Early symptoms (thirst, dry mouth, reduced performance)
 - Advanced symptoms (dizziness, confusion, rapid heart rate)
 - Increased risk of heat-related illnesses
 - Heat exhaustion vs. heat stroke
 - Impaired thermoregulation in firefighting conditions
 - Cardiac risks
 - PPE and environmental factors contributing to fluid loss
- Hydration Requirements for Firefighters
 - Recommended daily water intake under normal and extreme conditions
 - Adjusting intake based on temperature, PPE, duration and intensity of operations
- Beverages and Substances That Should Be Avoided
 - High-sugar drinks (carbonated, high-fructose content)
 - Energy drinks (caffeine, stimulants, cardiac risks)
 - Caffeine limits for firefighters (max 400 mg/day)
 - Alcohol (prohibited within 8 hours of duty)
 - Excessive fluids (hyponatremia risk)
- Hydration Strategies for Training and Emergency Operations
 - Preparing the body for exertion (prehabilitation)
 - Maintaining fluid balance on the fireground
 - Water vs. electrolyte solutions
 - Hydration strategies during rehab periods

Resources

Activities

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Materials

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Facilities

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Notes

NFPA 1584 provides guidance for this lesson.

Module: Health and Wellness

Block 1: Introduction to Health and Fitness

- Recovery and rehydration best practices
- Monitoring Hydration Status
 - Methods of assessing hydration
- Implementing Corrective Actions for Dehydration
 - Recognizing and responding to dehydration in oneself and crew members
 - Immediate interventions for dehydration symptoms
- Long-term hydration habits for firefighter health

Lesson 4: Wellness

(-- minutes)

Learning Objectives

LO? .

Enabling Learning Objectives

1. x

Content Outline

- Routine Stress Management
- Cancer Awareness
- Mental Health
- Healthy Relationships
- Developing Healthy Coping Mechanisms
- Financial Management

Resources

Activities

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Materials

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Facilities

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Notes

Module: Health and Wellness

Block 2: Physical Assessment

Lab 1: Pre-Assessment Preparation

(-- minutes)

Learning Objectives

- LO1 Describe the physical demands of firefighting
- LO4 Demonstrate musculoskeletal strength
- LO5 Demonstrate cardiovascular endurance
- LO6 Demonstrate flexibility

Enabling Learning Objectives

1. Recognize the correlation between general health and occupational injury (LO1)

Content Outline

- **Fundamentals of Physical Wellness**
 - Physical Training
 - Health status questionnaire
 - Cardiovascular Training
 - Cardiac risk stratification questionnaire
 - Strength / Core Training
 - Flexibility / Range of Motion
 - Total Integration
- **Nutrition and Hydration**
 - Nutrition
 - Plan a Meal activity.
 - Hydration
- **Injury Prevention**
 - Body mechanics
- **Pre-Assessment Vital Signs and Anthropometrics**
 - Resting heart rate (RHR)
 - Blood pressure
 - Maximum Heart Rate (HR_{max}) will be determined by referencing **Table A.1** in the appendix of this module.
 - Target Heart Rate will be determined by referencing **Table A.2** in the appendix of this module.
- **Body Mass Index (BMI)**
 1. The student will be weighed using a calibrated beam or electronic scale while wearing minimal clothing, shoes removed, and having empty pockets.
 2. The student will be measured for height using a stadiometer or tape measure while standing straight with shoes removed.
 3. BMI will be determined by referencing **Table A.3** in the appendix of this module.
 4. BMI risk category will be determined by referencing **Table A.4** in the appendix of this module.

Resources

Activities

- Health status determination
- Cardiac risk stratification
- **FA-01** Body composition
- **FA-06** Plan a Meal

Materials

- Vital signs equipment
- Calibrated weight scale
- Height measurement equipment

Facilities

- A quiet environment free of factors that would interfere with the measurement of resting heart rate.

Notes

Module: Health and Wellness

Block 2: Physical Assessment

Waist to Hip Ratio (WHR)

1. The student will stand upright with arms relaxed at the sides, feet slightly apart (~4 in), and body weight evenly distributed on both feet.
2. The student will be measured for waist and hip circumference, twice, alternating locations, using a cloth measuring tape with a spring-loaded handle, ensuring that adipose tissue is not compressed. The two measurements of a location must be within 0.5 in.
3. The instructor will measure the waist circumference at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest (hip bone).
4. The instructor will measure the hip circumference around the widest portion of the buttocks, approximately at the level of the greater trochanter.
5. WHR will be determined by dividing the average of the two waist measurements by the average of the two hip measurements.
6. WHR risk category will be determined by referencing **Table A.5** in the appendix of this module.

Lab 2: Aerobic Capacity

(20 minutes)

Learning Objectives

LO4 Demonstrate aerobic capacity

Content Outline

Aerobic Capacity Assessment Protocol

- This protocol assesses the student's aerobic capacity by estimating their maximal oxygen uptake ($\dot{V}O_{2max}$).
- While the NFPA doesn't mandate a specific $\dot{V}O_{2max}$ score, it emphasizes the importance of cardiorespiratory fitness for firefighters.
 - A $\dot{V}O_{2max}$ of 40-45 ml/kg/min is generally considered a good target for firefighters.
- Before starting this protocol, student must calculate the following information:
 - Determine Body Mass Index (BMI)
 - Determine Target Heart Rate (THR)
- The instructor will inform the student of all assessment components, ensuring the student is in proper clothing and footwear.

Resources

Activities

- FA-02 Aerobic capacity

Materials

- PST or "Beep Test" app or audio file
- Speaker or public address system

Facilities

- 65 foot open flat area
- Cones or other markings

Notes

Common beep test apps may provide more detailed analysis based on sex and age of the student.

Module: Health and Wellness

Block 2: Physical Assessment

- The instructor will review all criteria for stopping the assessment with the student.

Progressive Multistage Shuttle Run Test (PST)

1. Choose a flat and smooth surface, place cones or markers 65 feet apart to mark the running distance and lanes.
2. To conduct the test, you will need an audio file or an app that provides the beep signals at specific intervals as listed in **Table A.6** in the appendix of this module. These beeps indicate when to start running and when to reach the opposite cone. Connect to a speaker or PA system to ensure students can hear the signals.
3. To prevent injuries, students should perform warm up movement and stretching before the test begins.
4. Read the test instructions provided in **Box A.7** in the appendix of this module.
5. Students will stand behind the starting cone or marker.
6. When the first beep sounds, students will run towards the opposite cone or marker. The goal is to reach the cone before the next beep.
7. Every minute, the time between beeps decreases and the running speed increases.
 - If the line is reached before the beep, the subject waits for the beep before continuing.
 - If the line is not reached before the beep, the subject gets a warning and must run to the line, turn, and try to catch up with the pace within two more beeps.
 - The subject receives a warning the first time they fail to reach the line (within 6 feet) and is eliminated after the second warning.
8. The test is complete when a student is unable to keep up with the beeps or complete the required number of shuttles. The last completed shuttle determines the fitness level. Record the result.
7. $\dot{V}O_{2\max}$ score category will be determined by referencing **Table A.6** in the appendix of this module.
9. After the test, instruct students to cool down by continuing to walk in an area away from the running lanes.

Module: Health and Wellness

Block 2: Physical Assessment

Lab 3: Power

(-- minutes)

Learning Objectives

LO5 Demonstrate musculoskeletal strength

Content Outline

▪ Vertical Jump Assessment Protocol

- This protocol assesses lower body power output by measuring standing vertical jump height.
- This is an accurate predictor of power in other muscle groups.
- The instructor will demonstrate the assessment.
- Allow students to perform up to three practice trials before administering the assessment.

1. Students will stand adjacent to the wall with the inside shoulder of the dominant arm approximately 6 inches from the wall.
2. Mark the student's standing height by marking the students fingers with chalk, having the student extend their arm overhead, and pressing the fingers against the wall. This mark will be compared to the maximal height achieved on a vertical jump.
3. The student then lowers their arm and without any delay or steps, drops into a squat movement before exploding upward into a vertical jump.
4. At the highest point of the jump, the student will touch the wall, marking it with chalk.
5. Measure the distance between the first and second marks.
6. Jump height score category will be determined by referencing **Table A.8** in the appendix of this module.

▪ Static Handgrip Strength Assessment Protocol

- This protocol assesses
1. Adjust the dynamometer grip bar so the second joint of the fingers fit snugly over the handle.
 2. Students will stand with feet slightly apart and hold the dynamometer straight overhead.
 3. Students will squeeze the dynamometer as hard as they can while bringing their arm down to their side without holding their breath (to avoid the Valsalva maneuver). Neither the hand nor the dynamometer should touch the body or any other object.

Resources

Activities

- FA-03 Power

Materials

- Chalk
- Measuring tape or stick
- Stepstool or ladder
- Handgrip dynamometer

Facilities

- A smooth wall with a ceiling greater than 30 inches above the tallest student.
- A flat stable floor with good traction.

Notes

A roll of paper may be used to protect the wall. The paper should be colored to clearly show the chalk marks.

Module: Health and Wellness

Block 2: Physical Assessment

4. Repeat the test twice. Maximum grip strength is the highest value attained.
5. Handgrip Strength score category will be determined by referencing **Table A.9** in the appendix of this module.

Lab 4: Strength and Endurance

(-- minutes)

Learning Objectives

- LO5 Demonstrate musculoskeletal strength
- LO6 Demonstrate cardiovascular endurance

Content Outline

▪ Push-Up Assessment Protocol

- This protocol assesses upper body muscular strength and endurance.
 - The instructor will demonstrate and explain the proper push-up form.
 - Hand will be placed shoulder-width apart, pointing forward, directly under the shoulders.
 - Hips, shoulders, and knees will be kept in alignment. No sagging or arching of the back will be allowed.
 - Head should remain in a neutral or slightly extended (facing upward) position. Positioning the forehead toward the mat is discouraged.
1. Students will start the assessment in the “down” position.
 2. On the command “Begin,” student will perform as many pushups as they can in 2 minutes.
 3. A complete push-up requires:
 - a. full elbow extension with a straight back and rigid torso in the “up” position, and
 - b. a return to the “down” position with the chest touching a rolled towel, foam block, or depth feedback system without resting the stomach or body on the mat.
 4. The assessment is terminated with the student is unable to complete a repetition or fails to maintain proper form for two consecutive repetitions.
 5. Push-up score category will be determined by referencing **Table A.10** in the appendix of this module.

Resources

Activities

- FA-04 Strength and Endurance

Materials

- Mat (optional)
- Towel, foam block, or other push-up depth feedback system
- Stopwatch

Facilities

- Open area

Notes

The Front-Plank protocol has replaced the sit-up or curl-up movement. Studies have shown that sit-ups do not predict endurance and have higher incidence of back injury. (Strand,

Module: Health and Wellness

Block 2: Physical Assessment

▪ **Plank Assessment Protocol**

- This protocol assesses core strength and endurance.
 - The instructor will demonstrate and explain the proper front-plank form.
 - The body will rest on the toes and forearms with elbows in contact with the floor so that the upper arm is perpendicular with the floor.
 - Hips, shoulders, and knees will be kept in alignment and off the floor.
 - Feet may be together or up to shoulder width apart.
 - The student must hold a rigid anatomical body position so that only their forearms and toes support their body.
1. Students will start the assessment in the “down” position, feet and forearms in position, with the body resting on the floor.
 2. On the command “Begin,” student will raise their body into the front-plank position.
 3. Students will hold this position for as long as they can. Instructors will provide verbal cues to correct student form as needed.
 4. The assessment is terminated when the student is voluntarily stops the test or fails to maintain the proper position.
 5. Front plank score category will be determined by referencing **Table A.11** in the appendix of this module.

Lab 5: Flexibility and Mobility

(-- minutes)

Learning Objectives

L07 Demonstrate flexibility

Content Outline

▪ **Canadian Trunk Forward Flexion (Sit and Reach) Test**

- This protocol assesses flexibility and mobility of the hip joint. This measurement is a strong indicator of overall flexibility and mobility.
- The instructor will demonstrate and explain the proper sit-and-reach form.
 - Sit flat on the floor with feet pressed against the box.
 - Knees must remain flat against the floor.

Resources

Activities

- FA-05 Mobility and Flexibility

Materials

-

Facilities

-

Notes

Module: Health and Wellness

Block 2: Physical Assessment

- Students should breathe normally during the test and not hold their breath at any point.
1. Prior to the test the students should perform a short warm-up that includes some stretches of the hamstring and lower back.
 2. The student will sit without shoes and the soles of the feet flat against the sit-and-reach box with the zero mark at 15cm. Inner edges of the soles should be 15cm apart.
 3. The student should **slowly** reach forward with both hands as far as possible, holding this position for approximately 2s. To assist with the best attempt, the student should exhale and drop the head between the arms when reaching.
 4. The Student must keep their hands parallel and not lead with one hand, or bounce. Fingertips can be overlapped and should be in contact with the measuring portion of the sit-and-reach box.
 5. The score is the most distant point reached with the fingertips. The best of two trials should be recorded.
 6. Sit and Reach score category will be determined by referencing **Table A.12** in the appendix of this module.

Appendix A: Assessment Protocol Information Tables

Table A.1: Maximum Heart Rate by Age (HR_{max})

Age (years)																					
	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56
HR_{max}	204	202	200	198	196	194	192	190	188	186	184	182	180	178	176	174	172	170	168	166	164

Based on the formula (HR_{max} = 220 – age) (NFPA 1580 H.5.2.4)

Table A.2: Target Heart Rate (THR)

Calculated Maximum Heart Rate (HR _{max})																					
RHR	40	43	46	49	52	55	58	61	64	67	70	73	76	79	82	85	88	91	94	97	100
205	73	75	78	80	83	85	87	90	92	95	97	99	102	104	107	109	111	114	116	119	121
200	72	74	77	79	82	84	86	89	91	94	96	98	101	103	106	108	110	113	115	118	120
195	71	73	76	78	81	83	85	88	90	93	95	97	100	102	105	107	109	112	114	117	119
190	70	72	75	77	80	82	84	87	89	92	94	96	99	101	104	106	108	111	113	116	118
185	69	71	74	76	79	81	83	86	88	91	93	95	98	100	103	105	107	110	112	115	117
180	68	70	73	75	78	80	82	85	87	90	92	94	97	99	102	104	106	109	111	114	116
175	67	69	72	74	77	79	81	84	86	89	91	93	96	98	101	103	105	108	110	113	115
170	66	68	71	73	76	78	80	83	85	88	90	92	95	97	100	102	104	107	109	112	114
165	65	67	70	72	75	77	79	82	84	87	89	91	94	96	99	101	103	106	108	111	113
160	64	66	69	71	74	76	78	81	83	86	88	90	93	95	98	100	102	105	107	110	112

Based on Karvonen's formula (THR = [HR_{max} – RHR] x 0.8 + RHR). (NFPA 1580 H.5.2.4) Target intensity for this table is 80%

Table A.3: Body Mass Index (BMI) Conversion Table

Height in. (ft. in.)	Body Weight (lbs.)																				
	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186
58 (4'10)	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186
59 (4'11)	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173	178	183	188	193
60 (5'0)	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199
61 (5'1)	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206
62 (5'2)	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213
63 (5'3)	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220
64 (5'4)	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227
65 (5'5)	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234
66 (5'6)	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216	223	229	235	241
67 (5'7)	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249
68 (5'8)	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256
69 (5'9)	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263
70 (5'10)	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271
71 (5'11)	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250	257	265	272	279
72 (6'0)	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258	265	272	279	287
73 (6'1)	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295
74 (6'2)	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	280	287	295	303
75 (6'3)	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	303	311
76 (6'4)	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320
BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39

Reproduced from the National Institutes of Health (https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmi_304tbl.htm) and Fire Service Joint Labor Management Wellness-Fitness Initiative (WFI) Manual, 4th Edition

Table A.4: Health Risk Categories for BMI by Sex	
Category	Body Mass Index
Underweight	Less than 18.5
Healthy	18.5 - <25
Overweight	25 - <30
Class 1 Obesity	30 - <35
Class 2 Obesity	35 - <40

Reproduced from the Centers for Disease Control and Prevention

Table A.5: Health Risk Categories for WHR by Sex		
Category	Waist to Hip Ratio	
	M	F
Low Risk	0.95 or lower	0.80 or lower
Moderate Risk	0.96-1.0	0.81-0.85
High Risk	1.0 or higher	0.86 or higher

Waist-to-Hip Ratio is calculated by dividing waist circumference by hip circumference (waist/hip)
 Reproduced from the World Health Organization.

Table A.6: Protocol for Progressive Multistage Shuttle Run Test						
Category	Stage	$\dot{V}O_{2max}$ (mg/kg/min)	Number of Shuttles	Speed (mi/h)	Speed (km/h)	Split Time (sec)
Poor	1	16.2	7	5.0	8	9.00
	2	29.2	8	5.6	9	8.00
Fair	3	32.1	8	5.9	9.5	7.58
	4	35.0	9	6.2	10	7.20
	5	37.9	9	6.5	10.5	6.86
Good	6	40.8	10	6.8	11	6.55
	7	43.7	10	7.1	11.5	6.26
	8	46.6	11	7.5	12	6.00
Very Good	9	49.6	11	7.8	12.5	5.76
	10	52.5	11	8.1	13	5.54
	11	55.4	12	8.4	13.5	5.33
	12	58.3	12	8.7	14	5.14
	13	61.2	13	9.0	14.5	4.97
Excellent	14	64.1	13	9.3	15	4.80
	15	67.1	13	9.6	15.5	4.65
	16	70.0	14	9.9	16	4.50
	17	72.9	14	10.3	16.5	4.36
	18	75.8	15	10.6	17	4.24
	19	78.7	15	10.9	17.5	4.11
	20	81.6	16	11.2	18	4.00
	21	84.6	16	11.5	18.5	3.89

Adapted from Leger (1982), Ramsbottom (1988), and Mcgee (2021)

Box A.7: Instructions for the Progressive Multistage Shuttle Run Test

The shuttle run test you are about to take gives an indication of your maximum aerobic capacity or power and involves running there and back along a 65-foot track.

Speed will be controlled by means of a beep at regular intervals. Pace yourselves so as to be at one end of the 65-foot track or the other when you hear the beep. You must be within six feet of the end marker for the shuttle to count.

The speed will start off slow and will increase steadily every minute. Your goal in the test is to follow the set rhythm for as long as possible. You should stop when you can no longer keep up with the set rhythm or feel unable to complete the 1—minute period in progress. Note the last number announced for the relevant period - that is your result. The duration of the test varies according to the individual: the fitter you are, the longer the test lasts.

The test is maximal and progressive, in other words easy at the beginning and hard towards the end. Good luck!

Adapted from Ramsbottom, R., et al. (1988)

Table A.8: Fitness Categories for the Vertical Jump by Sex

Category	Jump Height by Sex (in)	
	Male	Female
Excellent	>28	>24
Very Good	24-28	20-24
Good	20-24	16-20
Fair	16-20	12-16
Poor	12-16	8-12

Reproduced from the ASCM Guidelines for Exercise Testing and Prescription, 11th Edition

Table A.9: Fitness Categories for Handgrip Strength by Age and Sex

Category	Pounds of Force by Age and Sex							
	20-29		30-39		40-49		50-59	
Sex	M	F	M	F	M	F	M	F
Excellent	34	22	38	23	40	23	39	23
Very Good	38	24	42	25	44	26	43	25
Good	43	27	47	28	48	29	48	28
Fair	48	29	52	31	53	31	52	31
Poor	52	32	56	34	57	34	56	33

Adapted from the ASCM Guidelines for Exercise Testing and Prescription, 11th Edition

Table A.10: Fitness Categories for the Push-up by Age and Sex

Category	Repetitions by Age and Sex							
	20-29		30-39		40-49		50-59	
Sex	M	F	M	F	M	F	M	F
Excellent	36	30	30	27	25	24	21	21
Very Good	29	21	22	20	17	15	13	11
Good	22	15	17	13	13	11	10	7
Fair	17	10	12	8	10	5	7	2
Poor	16	9	11	7	9	4	6	1

Reproduced from the ASCM Guidelines for Exercise Testing and Prescription, 11th Edition

Table A.11: Fitness Categories for the Front Plank by Sex

Category	Hold Time (sec)	
	Male	Female
Excellent	201	142
Very Good	137	95
Good	110	72
Fair	89	58
Poor	62	35

Adapted from Strand (2014)

Table A.12: Fitness Categories for the Sit and Reach by Age and Sex

Category	Distance (centimeters) by Age and Sex							
	18-25		26-35		36-45		46-55	
Sex	M	F	M	F	M	F	M	F
Excellent	22	24	21	23	21	22	19	21
Very Good	20	22	19	21	19	21	17	20
Good	18	20	17	20	16	18	14	17
Fair	15	18	14	17	13	16	11	14
Poor	13	16	11	15	11	14	9	12

Reproduced from the ASCM Guidelines for Exercise Testing and Prescription, 11th Edition

DRAFT

Standards

NFPA 1500 Standard on Fire Department Occupational Safety, Health, and Wellness Program (2021)

5 Training, Education, and Professional Development

5.1 General Requirements.

5.1.1* The fire department shall establish and maintain a training, education, and professional development program with a goal of preventing occupational deaths, injuries, and illnesses.

A.5.1.1 The primary goal of all training, education, and professional development programs is the reduction of occupational injuries, illnesses, and fatalities. As members progress through various job duties and responsibilities, the department should ensure the introduction of the necessary knowledge, skills, and abilities to members who are new in their job titles, as well as ongoing development of existing skills.

These programs should include information to ensure that members are trained prior to performing individual duties, as well as ongoing professional development to ensure competency.

Training programs should include but not be limited to the following:

- (1) Community risk reduction (fire prevention, public education, investigation, etc.)
- (2) Health and safety
- (3) Fire suppression
- (4) Emergency medical
- (5) Human resources (leadership, supervision, interpersonal dynamics, equal employment opportunity, etc.)
- (6) Incident management system
- (7) Hazardous materials
- (8) Technical rescue
- (9) Information systems and computer technology
- (10) Position-specific development (fire fighter, company officer, chief officer, telecommunicator, investigator, inspector, driver/operator, etc.)

11 Medical and Physical Requirements

11.3 Health and Fitness.

11.3.1 The fire department shall establish and provide a health and fitness program that meets the requirements of NFPA 1583 to enable members to develop and maintain a level of fitness that allows them to safely perform their assigned functions.

11.3.2 The maintenance of fitness levels specified in the program shall be based on fitness standards determined by the fire department physician that reflect the individual's assigned functions and activities and that are intended to reduce the probability and severity of occupational injuries and illnesses.

11.3.3 The fire department health and fitness coordinator shall administer all aspects of the physical fitness and health enhancement program.

11.3.4 The health and fitness coordinator shall act as a direct liaison between the fire department physician and the fire department in accordance with NFPA 1582.

11.5 Infection Control.

11.5.1* The fire department shall actively attempt to identify and limit or prevent the exposure of members to infectious and contagious diseases in the performance of their assigned duties.

A.11.5.1 Where fire department members routinely respond to emergency medical incidents, the fire department should consult with medical professionals and agencies on measures to limit the exposure of members to infectious and contagious diseases. This should include the provision and maintenance of equipment to avoid or limit direct physical contact with patients, when feasible.

11.5.2 The fire department shall operate an infection control program that meets the requirements of NFPA 1581.

12 Behavioral Health and Wellness Programs

12.1* Behavioral Health Program.

A.12.1 A unique understanding of the fire service and its inherent dynamics, as well as advanced knowledge about trauma and addictions, is required of behavioral health specialists and clinicians to effectively address fire department members' behavioral issues and maintain overall behavioral health and wellness. The intrinsic value to the first responders of the availability of such behavioral health specialists trained in the unique cultural aspects of the fire service is essential to the success of the program. Such training should include regular opportunities for experiential learning such as ride-alongs and/or participation in live simulated training exercises, which help familiarize the behavioral health specialist with the daily working environment of the fire service.

Current research with first responders has shown that developing an understanding of how the body and brain respond to stress is essential. Developing coping mechanisms that support the unique behavioral health need and challenges of first responders maintain ongoing personal behavioral health is a core component of this program. Providing first responders with techniques to help mitigate the impacts of traumatic exposures is critical to long-term personal health, interpersonal dynamics, and overall organizational health. The term resiliency is used to address this multifaceted approach for overall health and well-being.

A behavioral health and wellness program can encompass all or some of the following services:

(1) Acute stress

(2) Traumatic exposures

- (3) Post-traumatic stress (PTS)
- (4) Depression
- (5) Grief
- (6) Family situations
- (7) Line-of-duty death (LODD) support services
- (8) Stress management
- (9) Substance use
- (10) Health and wellness concerns
- (11) Resiliency

A behavioral health and wellness program can utilize all or some of the following delivery methods to reach members:

- (1) Peer support program
- (2) MAP or EAP behavioral health problem identification, assessment, and grief counseling
- (3) Treatment and/or referrals to outside agencies, as appropriate
- (4) Family support and outreach
- (5) Follow-up services and case management
- (6) Leadership development
- (7) Executive coaching
- (8) Coaching for supervisors dealing with troubled employees
- (9) Workplace mediation
- (10) Conflict resolution
- (11) Health and psychoeducational materials/activities
- (12) Management of behavioral health care under insurance plans
- (13) Department diversity training
- (14) Officer and department-wide training
- (15) Chaplain services for spiritual needs

12.1.1* The fire department shall provide access to a behavioral health program for its members and their immediate families.

A.12.1.1 Basic levels of assistance as enumerated in the standard should be available at the first step of access. The objective should be to provide these services in a manner that facilitates ease

of access and usage, minimizes delays and obstacles, and encourages proactive utilization. Members and their families should be informed about the program, its services, and how to access its resources, both at the time that they enter the organization and regularly throughout their tenure. The behavioral health program should also serve as a resource for identification of and access to other important community resources such as self-help groups (e.g., Alcoholics Anonymous, Alanon, and Alateen), community health resources, parenting resources, and so forth. The behavioral health program should collaborate with the fire department's program to address occupational exposure to atypically stressful events (see Chapter 13).

The fire department behavioral health program does not need to be operated or financed by the fire department. Many community/county/state mental health agencies provide such services and these can be available without charge or at reduced fees. Labor and employee organizations can also sponsor and/or operate such programs. The fire department needs to have the ability to identify when pertinent problems exist and be able to provide confidential referral for professional services when indicated. Program standards developed by the Association of Labor-Management Administrators and Consultants on Alcoholism (ALMACA) and the Employee Assistance Professional Association (EAPA) recommend the following:

- (1) The physical location at which services are provided should facilitate easy access while ensuring confidentiality.
- (2) Medical and disability plans should be reviewed to ensure that plans provide adequate coverage for alcohol, substance, and mental health needs (including access to outpatient, intensive outpatient, partial hospitalization, inpatient and residential care, and day treatment options).
- (3) Staff of the fire department behavioral health program should be sufficiently familiar with medical and disability benefit plans to facilitate adequate advising regarding the extent, nature, and cost of the recommended treatment and the reimbursement available.

Primary staff for the program should possess the following:

- (1) Appropriate managerial and administrative experience in a clinical setting
- (2) Skill in clinical interviewing, diagnostic assessment, treatment planning, grief counseling, case management, and referral/care coordination for behavioral health problems and disorders
- (3) A Ph.D. or Master's degree in the field of psychology, clinical social work, mental health counseling, or psychiatric nursing
- (4) An active license in good standing in the state in which services will be delivered, as well as appropriate training and certification with respect to any direct clinical or counseling services relevant to the behavioral health issues in the fire service

Primary staff training should include regular opportunities for experiential learning such as ride-alongs and/or participation in live simulated training exercises, which help familiarize the behavioral health specialist with the daily working environment of the fire service.

Active and appropriately prepared peer personnel are often critical to the success of a fire service behavioral health program. These personnel serve most effectively as a bridge between the distressed member and professional services. They can serve valuable roles in outreach, referral, connection, awareness, and support for those who could benefit from support but might be unaware of its availability or benefits, are resistant to seeking help, or are uncertain about the confidentiality of services. With proper training, peer personnel can help coworkers evaluate situations, consider alternatives, and access resources. Preparation should include training regarding resources, protocols, and procedures related to the peer support program, as well as active listening skills, assessment, outreach, and referral skills. Preparation should emphasize boundaries between peer roles and staff responsibilities, especially with respect to counseling and intervention.

Peer personnel should operate in regular consultation with a licensed mental health provider, ideally the behavioral health specialist. It is important that members and their families are informed about the program and the services it offers and are continually updated on its existence, availability, and confidentiality. Information about the program should be made available to all new members and their families.

12.1.1.1 The behavioral health program shall at a minimum include the capability to provide diagnostic assessment, short-term counseling, crisis intervention, and referral for the following behavioral health and personal problems that could adversely affect the member, as well as fire department work performance:

- (1) Substance use disorder
- (2) Anxiety
- (3) Depression
- (4) Suicidality
- (5) Potentially traumatic events
- (6) Acute stress reactions
- (7) Grief
- (8) Financial problems
- (9) Relationship and/or family problems

12.1.1.2 Behavioral health programs that include a peer support component shall ensure that peers are provided with the knowledge and skills to provide support, educate members about behavioral health, serve as a bridge to behavioral health programs and community resources, and build or enhance their peer support programs.

12.1.1.3 The fire department shall provide training to all peer support members on the following topics:

- (1) Active listening skills

- (2) Recognition of mental health and substance abuse problems impacting members
- (3) Crisis intervention
- (4) How to access referrals to local resources and develop relationships with local behavioral health providers
- (5) How to build an effective peer support program

12.2 Wellness Program.

12.2.1* The wellness program shall provide prevention strategies and health promotion activities related to identified risk factors for fire fighter health and safety.

A.12.2.1 Components of a prevention and health promotion program should focus on cardiac risk reduction, smoking/tobacco cessation, blood pressure regulation, strength and aerobic physical fitness training, nutrition, stress management, diabetes prevention, metabolic syndrome prevention, weight management or control, shift work and sleep hygiene, infectious disease and control, and so forth, and should provide education and counseling for the purpose of preventing health problems and enhancing overall well-being.

The wellness program should also include education, resources, and counseling on a variety nonclinical issues relevant to member wellness and maintaining a balanced life, including, but not limited to, balancing emergency service work with marriage and family obligations, interpersonal communication skills, financial literacy, career/vocational guidance, and retirement planning.

12.2.2* The wellness program shall, wherever possible, employ prevention strategies and programs supported by peer-reviewed, published research for which published empirical research supports their safety and efficacy.

A.12.2.2 The fire department should develop a policy on the use of tobacco products for all members. The fire department should also develop a policy on the acceptance of new members into the fire department with regard to the use of tobacco products.

12.2.3 The fire department shall develop a policy on the use of tobacco products for all members.

12.2.3.1 The fire department shall provide a smoking/tobacco use cessation program to incumbent tobacco users that is nonpunitive and operates with short-term and long-term goals.

12.2.3.2 The fire department shall develop a policy that candidates be tobacco-free upon appointment and throughout their length of service to the department.

12.2.3.3 Members shall not use tobacco products inside the worksite, within or on fire department apparatus, or inside training facilities.

12.2.3.4* The fire department shall develop and implement SOP/Gs to provide strategies to manage the effects of acute and chronic sleep and circadian rhythm disruption that lead to sleep deprivation, fatigue, and other adverse health effects.

A.12.2.3.4 Research indicates that firefighters are at a high risk for sleep deprivation, fatigue, and sleep disorders. Firefighters who grapple with their “internal body clock” or circadian rhythm due to

shift work or other long work hours and are sleep deprived often struggle with memory, focus impairment, irritability, depression, and relationship/social problems. In turn these can lead to an increased risk of accidents and injuries. These studies also note that firefighters face potential health problems, including a higher risk of ulcers, insulin resistance, metabolic syndrome, heart disease, and cancer. Strategies to consider to combat acute and chronic sleep and circadian rhythm disorders include the following:

- (1) Strategic caffeine use
- (2) Taking naps
- (3) Proper sleep hygiene
- (4) Identification and treatment of sleep disorders

NFPA 1582 (2022)

8.2 Annual Fitness Evaluation.

8.2.1 General.

8.2.1.1 A mandatory fitness evaluation that is not punitive or competitive shall be conducted annually as part of an individualized program.

8.2.1.2 All component results of the mandatory fitness evaluation shall be used to establish an individual's baseline or measured against the individual's previous assessments and not against any standard or norm.

8.2.1.3* The mandatory fitness evaluation shall include a mandatory pre-evaluation procedure and the components in 8.2.2 and 8.2.3.

A.8.2.1.3 For additional information, see *The Fire Service Joint Labor Management Wellness - Fitness Initiative*.

8.2.2 Aerobic Capacity.

8.2.2.1* An evaluation of aerobic capacity shall be performed to assess cardiorespiratory fitness after medical evaluation.

A.8.2.2.1 Cardiorespiratory fitness equal to the 50th percentile of the general population standardized for age and biological sex is an appropriate target level.

8.2.2.2* Testing shall be conducted with a maximal or submaximal protocol using an empirically validated measure of cardiorespiratory fitness.

A.8.2.2.2 See *ACSM's Guidelines for Exercise Testing and Prescription*. Bicycle ergometry is appropriate as a measurement of aerobic capacity if it directly measures oxygen uptake (VO₂). An exercise stress test using bicycle ergometry is a maximal symptom-limited study performed on an electromagnetically-braked bicycle ergometer using a customized linear ramp protocol. The protocol consists of pedaling against a customized continuously increasing work rate in a ramp pattern to elicit fatigue within 8 to 12 minutes of exercise initiation. A 12-lead electrocardiogram is

continuously monitored, and blood pressure is manually assessed every 2 minutes. All responses are monitored throughout rest, exercise, and recovery and graphically displayed. The study is performed under supervision of a physician by a trained exercise physiologist or technician.

Refer to *The Fire Service Joint Labor Management Wellness-Fitness Initiative* or other authoritative resources for alternative validated aerobic capacity protocols, including stairmill tests, step tests, and run tests.

8.2.2.3* For an individual whose cardiorespiratory fitness levels are above the 35th percentile but below the 50th percentile for the general population standardized by biological sex and age [see Table 8.2.2.3(a) and Table 8.2.2.3(b)], the fire department physician shall require participation in a prescribed cardiorespiratory (aerobic) fitness program without job restrictions.

A.8.2.2.3 A reasonable aerobic cardiorespiratory fitness threshold for the safe and effective performance of physically demanding firefighting activities is at least the 50th percentile for the general population, based on the selected exercise protocol and the individual’s biological sex and age. Standardized threshold levels of aerobic capacity (in METs) correspond to the 50th percentile of cardiorespiratory fitness for the general population (based on age and biological sex) and are categorized as “fair” cardiorespiratory fitness levels. See *ACSM’s Guidelines for Exercise Testing and Prescription*.

The prescribed cardiorespiratory (aerobic) fitness program would be developed for the individual in consultation with the individual’s personal doctor and/or the AHJ’s health and wellness team. The individual would meet at a frequency identified during this consultation for appropriate follow-up and possible adjustment to the cardiorespiratory fitness program.

Table 8.2.2.3(a) Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (50th Percentile), Using Treadmill Protocol

Age	METs	
	Male	Female
20–29	13.7	10.7
30–39	12.1	8.6
40–49	10.8	7.6
50–59	9.3	6.7
60–69	8.1	5.7

Table 8.2.2.3(b) Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (50th Percentile), Using Cycle Ergometer Protocol

Age	METs	
	Male	Female
20–29	12.0	8.9
30–39	8.6	6.2
40–49	7.7	5.5
50–59	7.1	4.9
60–69	6.4	4.6

8.2.2.4* For an individual whose cardiorespiratory fitness falls below the 35th percentile for the general population standardized by biological sex and age [see Table 8.2.2.4(a) and Table 8.2.2.4(b)], the fire department physician shall do both of the following:

- (1) Recommend to the AHJ that the individual be restricted from performing essential job tasks 1, 2, 4, 5, 6, 7, 8, 9, and 13
- (2) Require the individual to participate in a prescribed cardiorespiratory (aerobic) fitness program

A.8.2.2.4 The minimum acceptable aerobic cardiorespiratory fitness threshold for the safe and effective performance of physically demanding firefighting activities is at least the 35th percentile for the general population, based on the selected exercise protocol and the individual’s biological sex and age. Adjusted minimum threshold levels of aerobic capacity (in METs) correspond to the 35th percentile of cardiorespiratory fitness for the general population (based on age and biological sex) and are categorized as “poor” cardiorespiratory fitness levels. See *ACSM’s Guidelines for Exercise Testing and Prescription*.

The prescribed cardiorespiratory (aerobic) fitness program would be developed for the individual in consultation with the individual’s personal doctor and/or the AHJ’s health and wellness team. The individual would meet at a frequency identified during this consultation for appropriate follow-up and possible adjustment to the cardiorespiratory fitness program.

Table 8.2.2.4(a) Minimum Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (35th Percentile), Using Treadmill Protocol

Age	METs	
	Male	Female
20–29	12.4	9.6
30–39	11	7.8
40–49	9.9	6.9
50–59	8.4	6.1
60–69	7.3	5.3

Table 8.2.2.4(b) Minimum Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (35th Percentile), Using Cycle Ergometer Protocol

Age	METs	
	Male	Female
20–29	10.7	7.6
30–39	7.9	5.6
40–49	7.1	5.1
50–59	6.6	4.6
60–69	6	4.3

8.2.3* Strength, Endurance, and Flexibility. An evaluation of muscular strength, endurance, and flexibility shall be conducted.

A.8.2.3 Evaluation protocols can be found in *The Fire Service Joint Labor Management Wellness-Fitness Initiative*.

NFPA 1583 Standard on Health-Related Fitness Programs for Fire Department Members (2021)

5 Health and Fitness Coordinator and Peer Fitness Trainers

5.1 Assignment.

5.1.2* The health and fitness coordinator shall be either a member of the fire department or a qualified outside agent.

A.5.1.2 The fire department can choose to acquire the services of an outside agent to serve as the health and fitness coordinator. This health and fitness coordinator should meet or exceed the training and educational background listed in **A.5.2.1**. The fire department should ensure that such an outside agent is familiar with the unique stresses present on the fireground.

Appropriate outside agents can be found at local colleges or universities in the exercise science, kinesiology, physical fitness, or fire technology departments. The private sector can also provide qualified personnel to serve as health and fitness coordinators. Such sources include hospital-based fitness programs, medical facilities, or private companies that provide fitness assessment and wellness programs.

5.1.3* The health and fitness coordinator shall have access to the fire department physician and other subject matter experts for consultation.

A.5.1.3 Examples of subject matter experts for consultation are exercise physiologists, athletic trainers, and representatives of university health and wellness programs and executive wellness programs.

5.2* Qualifications for Health and Fitness Coordinator.

A.5.2 There are no broadly accepted educational standards for health and fitness personnel in the United States. While it would be an unrealistic and unattainable goal to require that all health and fitness coordinators have a baccalaureate or graduate degree in a related discipline, it is important to note the level of formal training such a degree connotes.

5.2.1* The health and fitness coordinator shall have access to appropriate educational materials and formal certification from a professional organization, relevant educational experience, appropriate academic degrees, completion of course work relevant to the program components, or attendance at workshops related to health and fitness.

A.5.2.1 A number of professional organizations, including those listed in **Table A.5.2.1**, provide training and educational experiences as well as certification programs for interested persons. It is in

the best interests of fire departments to avail themselves of these professional services as time and resources allow.

The health and fitness coordinator should have a background in functional anatomy, exercise physiology, biomechanics, movement observation and assessment, fitness testing, exercise programming, coaching, and leadership.

5.2.2 The health and fitness coordinator shall maintain the continuing education requirements dictated by the coordinator's certifying body or as described in the fire department's job description, whichever sets forth the higher standard.

5.3 Peer Fitness Trainers.

5.3.1 Peer fitness trainers shall work under the direction of the health and fitness coordinator to oversee safe participation in health-related fitness programs.

5.3.2 Peer fitness trainers shall implement and oversee fitness programs for academy recruits as directed by the department health and fitness coordinator.

5.3.3* Peer fitness trainers shall have the level of training and certification required by the fire department and shall maintain their recertification requirements as prescribed by the certifying organization.

A.5.3.3 A minimal level of certification [IAFF/IAFC/ACE Peer Fitness Trainer (PFT)] can be obtained from American Council on Exercise (ACE) as recommended by the IAFF/IAFC *Wellness-Fitness Initiative*.

6 Fitness Assessment

6.1 General.

6.3 Pre-assessment Questionnaire. All members shall complete a pre-assessment questionnaire that seeks to identify contraindications for participation in the fitness assessment and department exercise training program.

6.4* Fitness Assessment Components. The annual fitness assessments shall consist of the following components:

- (1) Body composition
- (2) Aerobic capacity
- (3) Speed and power
- (4) Muscular strength
- (5) Muscular endurance
- (6) Mobility and flexibility

A.6.4 The IAFF in conjunction with the IAFC has developed a Wellness-Fitness Initiative for the fire service. The initiative gives a department a template for developing a comprehensive fitness

program. (Annex C provides a self-assessment tool for determining fitness levels.) The following examples are from the IAFF/IAFC Wellness-Fitness Initiative as well as other fitness assessment protocols, which vary in terms of ease of administration, safety, cost, and predictive value:

(1) Body composition, including the following:

- (a) Skinfold (various)
- (b) Circumference (various)
- (c) Bioimpedance (BIA)
- (d) Hydrostatic weighing
- (e) Body mass index**
- (f) Waist-to-hip ratio**

(2) Aerobic capacity, including the following:

- (a) 1 mile (1.6 km) walk
- (b) 1.5 mile (2.4 km) run/walk
- (c) 12-minute run
- (d) Step test (various)
- (e) Stepmill
- (f) Cycle ergometer (various)
- (g) Treadmill (various)

(3) Speed and power, including the following:

- (a) Vertical jump
- (b) Broad jump
- (c) Jump squat
- (d) Plyometric push-up
- (e) Plyometric pull-up
- (f) Medicine ball throw

(4) Muscular strength and endurance, including the following:

- (a) Squat (1 rep maximum, percent of body weight)
- (b) Bench press (1 rep maximum or percent of body weight)
- (c) Push-ups (maximum repetitions)**

(d) Inverted row (maximum repetitions)

(e) Side plank (maximum time)

(5) Mobility and flexibility, including the following:

(a) Weight bearing lunge (ankle mobility)

(b) Straight leg raise (hip mobility)

(c) Shoulder reach (shoulder mobility)

7 Exercise and Fitness Training Program

7.1* Program Components.

The fire department's exercise and fitness training program, administered by the department health and fitness coordinator and their peer fitness trainer, shall consist of the following components at a minimum:

(1) Educational program that describes the components and the benefits of exercise on performance and health

(2) Individualized exercise programming based on the results of the fitness assessment

(3) Warm-up and cool-down exercise guidelines

(4) Metabolic conditioning program to include aerobic and anaerobic fitness

(5) Muscular resistance (strength, endurance) exercise programming

(6) Flexibility and mobility program

(7) Injury prevention program with focus on the back, knees, and shoulders

A.7.1 Annex **B** provides further information about each component of the fire department's exercise and fitness training program to assist the health and fitness coordinator in setting up and administering such a program.

7.2 Program Participation.

7.2.1 The fire department physician shall clear all members for participation in the exercise and fitness training program as directed by NFPA 1582.

7.2.2 After a member returns to full duty from a debilitating injury, illness, or any other extended leave, a peer fitness trainer or the health and fitness coordinator shall design an individualized exercise program under direction of the department physician or other attending health care professional.

7.2.3 A peer fitness trainer or health and fitness coordinator shall design an individualized exercise and fitness training program, under direction of the department physician or other attending health care professional, to maintain the member's fitness while on restricted duty.

8 Health Promotion Education

8.1* General Requirements.

The fire department shall provide health promotion education as an integral part of the health-related fitness program.

A.8.1 Health education is now the driving force of health promotion and disease prevention. In the fall of 1993, the Centers for Disease Control (CDC) formally added “and Prevention” to its name. At that time the CDC director announced that prevention’s time had come in America. Coincident with this, third-party payers had begun to recognize the value of education about prevention and began to reimburse for preventive services and risk-reduction counseling. Organizations that establish health care guidelines in this country, such as the US Preventive Services Task Force and American Academy of Family Physicians, unanimously agree that most clinical evaluation time for the average nonpregnant adult should be spent on counseling. It is in that spirit that this technical committee is promoting health education as a major part of the health-related fitness program.

8.1.1* The fire department shall provide for the education of members regarding health risk reduction, cardiovascular risk reduction, general health maintenance, fitness, nutrition, sleep, and the prevention of occupational injuries, illnesses, accidents, or fatalities.

A.8.1.1 It is understood that the number and type of available resources vary greatly between fire departments. Despite such differences, adequate low-cost resources are universally available to satisfy this standard.

The fire department is encouraged to use an opportunistic team approach in the dissemination of informational materials, fostering, for example, collaboration between the fire department physician, the health and safety officer, and the health and fitness coordinator. Information obtained from the physician could be complemented by that supplied by guest speakers at fire department meetings. The balance of information could be available in the form of pamphlet materials kept in an accessible display case at the firehouse. Most materials are available free of charge through public medical organizations, public health agencies, professional organizations such as the IAFF, NVFC, or IAFC, or private advocacy groups, or can be found on the Internet and downloaded free of charge.

8.1.2* The fire department, under the direction of the fire department physician and the health and fitness coordinator, shall provide education regarding all of the topics in 8.1.1.

A.8.1.2 Educational materials can be in print or electronic form and administered in a formal or informal manner on the following topics:

- (1) Behavioral health, alcohol and substance abuse prevention, suicide prevention, PTSD
- (2) Pap smears, annual gynecological exams, colonoscopies, mammograms, and prostate-specific antigen (PSA) tests
- (3) Tobacco cessation programs
- (4) Cancer risks, including skin cancer (the most common form of cancer), colon cancer, prostate cancer, breast cancer, and lung cancer

(5) Nutrition education, including lipids, weight management, diabetes, metabolic syndrome, and effects of obesity

(6) Hypertension

(7) Infectious diseases, including recommendations for the prevention of influenza, hepatitis, tetanus, pneumonia, tuberculosis, varicella (chicken pox), measles, and rubella, as well as immunization recommendations for given age groups

(8) Sexually transmitted diseases, including recommendations for prevention, diagnosis, and treatment of HIV, hepatitis, herpes, and chlamydia

(9) Cardiovascular risk reduction

(10) Sleep hygiene and fatigue management

(11) Self-care, including safe body mechanics and low back injury prevention

8.1.3 Materials on the matters in 8.1.1 shall be made available to all members on an ongoing basis, with resource materials updated annually to ensure current information.

8.1.4 The fire department shall provide education and guidance regarding access to the department's member assistance program (MAP) as required by NFPA 1500.

8.1.5 The fire department shall encourage all members to obtain ongoing health care from their primary care providers.

Annex B — Sample Fitness Plan

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 Benefits of Exercise. The benefits of exercise extend from physical and mental health to performance and quality of life. The emphasis of an exercise program should be placed on maintaining or increasing an individual's fitness, creating positive lifestyle changes, and enhancing job performance (i.e., work life and play).

Annex C — Self-Assessment Tool

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

C.1 General. A self-assessment gives the member valuable feedback on their individual fitness level, ability to recover from exertion, and overall physical capacity. It is an evaluation that the member can safely perform in private to gain insight regarding their current fitness, recent improvement, and areas to pursue further change.

The self-assessment described in this annex can be performed with minimal equipment. It can be customized for and by each member to ensure that it accommodates their current abilities. The information collected from the assessment is valuable because it can be used to track progress and identify specific areas that could be targeted with an exercise program. The results can also

shed light on specific aspects of the member's capacity that will influence their safety on the fireground (e.g., ability to recover).

A personalized exercise program is a major component of the wellness program. It should accommodate the member's current level of fitness as determined with information from the periodic assessments completed throughout the year, in addition to relevant job duties, barriers to activity, physical capabilities, dietary status, sleep habits, motivation, and mindset.

NFPA 1584 Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises (2022)

3 Definitions

3.3.14 Energy Drink. A type of beverage containing stimulant drugs (caffeine and other ingredients such as taurine, ginseng, and guarana) that is marketed as providing mental or physical stimulation.

3.3.16* Hydration. The introduction of water in the form of food or fluids into the body.

A.3.3.16 Hydration. Dehydration is the loss of body fluid, or a negative fluid balance. The magnitude of dehydration can vary tremendously following strenuous activity in the heat. Dehydration can cause impairment of thermoregulation, decreased physical performance, increased cardiovascular strain, and a disruption of blood chemistry.

3.3.23 Prehabilitation. Physical and lifestyle preparation strategies to increase capability and capacity, reduce the potential for injury, and improve readiness in anticipation of an upcoming stressor.

3.3.27* Rehabilitation. An intervention designed to mitigate against the physical, physiological, and emotional stress of firefighting in order to sustain a member's energy, improve performance, and decrease the likelihood of on-scene injury or death.

A.3.3.27 Rehabilitation. Rehabilitation efforts should include providing relief from extreme climate and/or incident conditions, rest and recovery, rehydration, replacement of calories and electrolytes (as needed for scheduled activities of moderate to high intensity and lasting 1 hour or longer), active and/or passive cooling as needed for incident type and climatic conditions, and member accountability and medical treatment, if indicated.

4 Preparedness

4.3 Member Prehabilitation.

4.3.1* Members shall maintain proper hydration, nutrition, and rest to maintain normal body function.

A.4.3.1 Members should follow accepted guidelines for hydration and nutrition. Beverages, foods, and substances that should be avoided include the following:

(1) Carbonated, high-fructose-content, and high-sugar drinks [exceeding 7 percent carbohydrate (CHO) solution]

- (2) Foods with high fat and/or high protein content
- (3) Alcohol within 8 hours prior to duty
- (4) Excessive fluids
- (5) Tobacco
- (6) Creatine supplements
- (7) Ephedrine
- (8) Beverages exceeding 400 milligrams of caffeine per day
- (9) Energy drinks

Energy drinks, not to be confused with sports drinks, contain ingredients that can significantly raise heart rate and blood pressure and increase the cardiac risk to firefighters, especially when operating at high intensities. Due to the risk of sudden cardiac death, some countries have banned the sale of energy drinks.

4.3.2* Members shall maintain a physical fitness regime in accordance with NFPA 1583 as a prehabilitation strategy for incident response demands.

A.4.3.2 Physical conditioning is known to enable individuals to operate at a higher core temperature, decrease cardiovascular strain associated with strenuous activity, and improve physical performance. Maintaining good physical conditioning can optimize a member's performance under extreme conditions and facilitate effective rehabilitation.

A recommended way to reduce health risks is through sufficient hydration, diet, limited outdoor physical exercise on hot days, acclimatization, and monitoring of weather conditions to ensure members understand the dangers associated with working in climatic conditions. All members should train to acclimate to appropriate environmental conditions. The process of acclimatization should be done in a manner that builds up the member's ability to exercise or perform under more extreme conditions.

4.3.4 Members engaged in nonincident strenuous physical activities shall be allowed recovery time prior to returning to in-service status for incident response.

4.3.5 When a physically demanding event is scheduled (training/drill), members shall engage in pre-event warm-up activities to help prevent injuries.

6 Incident Scene and Training Rehabilitation

6.1 Criteria for Implementation. Rehabilitation shall be provided in accordance with fire department standard SOP/Gs, NFPA 1500, and NFPA 1561.

6.1.1 Rehabilitation shall commence whenever the physical or mental demands of an incident operation or training exercise poses a potential safety or health risk to members.

6.9* Emergency Medical Care.

A.6.9 The rehabilitation manager and company officers should monitor members who are at risk of suffering adverse health or safety effects and alert EMS personnel when appropriate. The fire department physician or appropriate medical authority should establish medical protocols and procedures with parameters regarding the following:

- (1) Immediate transport to an emergency medical facility
- (2) Close monitoring and treatment in rehabilitation
- (3) Release from rehabilitation

Currently, there are no studies that quantify vital sign measurements with the length of rehabilitation or with the need to direct members to a treatment area. Visual signs and symptoms remain the best method to evaluate members in the rehabilitation area.

The following information on vital signs can help the fire department physician or appropriate medical authority establish the parameters of medical monitoring.

6.9.1* During incident scene operations, transport-capable basic life support (BLS) EMS shall be on-site as part of the incident scene rehabilitation for the evaluation and treatment of symptomatic members.

A.6.9.1 Although BLS is the minimum level of care required in rehabilitation, the department should consider staffing rehabilitation with advanced life support (ALS) personnel, where available.

6.9.2 During training exercises, basic life support (BLS) personnel and equipment shall be on-site.

6.9.2.1 For live fire training in acquired structures, emergency medical services with transport capabilities shall be available in accordance with NFPA 1403.

6.9.2.2 For all other training activities, the instructor-in-charge shall evaluate the need for on-site transport capabilities based on a risk assessment of the training activity.

6.9.3 EMS personnel shall evaluate members with symptoms suggestive of a health and/or safety concern.