



PULLMAN FIRE DEPARTMENT

FITNESS PREPARATION FOR RESERVES

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Executive Summary

The Pullman Fire Department Reserve Firefighter Program requires applicants to maintain physical fitness to complete mandatory agility testing and to perform tasks throughout the program. This preparation program was designed to help applicants feel confident completing necessary exercise at an intensity similar to the agility test and tasks performed by a firefighter.

The fitness program was structured for individuals with any amount of fitness knowledge and at any fitness level. Ideally, the program should be initiated at least six months before the agility test. The purpose for starting the program early would be to ensure successful completion of the agility test and to create a habitual exercise routine that can be maintained throughout involvement with the fire service.

The fitness program contains three main components: cardiovascular training, strength training, and flexibility training. Most of the exercise suggestions contained in the program could be completed with little to no equipment. Any activity that is labeled “weighted” can be completed using any weighted object that is easily maneuverable according to the given activity. For example, an individual can add weight to a squat by placing books in a backpack and wearing it throughout the movement. A majority of the strength exercises can be completed with resistance bands, which are relatively inexpensive and are supplied in various resistances.

The example weekly exercise plans are optimal plans to follow, but they can also be modified to the needs of the individual. For example, it is suggested that women complete more upper body exercise in proportion to lower body and core exercises. Subsequently, more upper body strength exercise sessions can be substituted for or incorporated into lower body/core exercise days.

Nutritional information provided in the program contains generalized dietary intake recommendations and helpful examples of healthy food options for main food groups. The recommendations may not apply to each individual perfectly but could be used as a guide towards healthier eating habits.

By utilizing the fitness program, individuals desiring to pass the physical agility test will have a higher probability than individuals who do not physically train in preparation. Although, each individual varies based on their health and injury history and some exercises may need to be modified, substituted, or eliminated from the given program to prevent new or reoccurring injury. The Pullman Fire Department and/or the City of Pullman is not responsible for any injuries that could potentially occur while using the Fitness Preparation for Reserves program. The program provided is simply a guide and resource for prospective individuals interested in the Pullman Firefighter Reserve Program and should be used at the discretion of each individual.

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Reserve Fitness Program

Tasks completed by a firefighter are physically demanding and require regular maintenance of physical activity to complete jobs effectively. In addition, the agility test for the reserve firefighter program requires aerobic fitness, physical strength, and endurance of strength. The recommended program start time before completing the agility test is 6 months to a year if an individual is not physically active or performing semi-regular, light-intensity physical activity. Individuals that have been participating in moderate to high intensity physical activity for at least 6 months could potentially require less preparation. For those individuals the suggested workout could be completed in 3-6 months prior to the agility test.

Cardiovascular Training

Alternating forms of aerobic exercise can be beneficial to target different parts of the body and provide variety to workouts. In addition, cardio does not need to be performed during one session, it can be spread throughout the day if needed as long as intensity is maintained through each active session.

5 days/week, 30 minutes – 1 hour per day, moderate-high intensity (50%-80% MHR)

Mode of Exercise	Additional Information
Treadmill/Track/Neighborhood	Complete with increased weight via weighted backpack (<i>working up to 45 lbs</i>)*(<i>optional: changing intensity by speed or grade</i>)
Elliptical Machine	Complete with resistance
Rowing Machine/Seated Rows	If completing seated rows, use a resistance band
Stair Climber/Climbing Stairs	Complete at a maintainable speed
Stationary Bike/Moving Bike	If on a moving bike, incorporate hills and increased speed to accommodate intensity
Walking	Complete with increased weight via weighted backpack (<i>working up to 45 lbs</i>)*
Jump Rope	Complete at a maintainable speed
Aerobic Sport/Recreational Activity	<i>Example Activities:</i> Hiking Swimming Sports (soccer, basketball, football, ultimate frisbee, volleyball) Jogging

* = the weight vests that are worn during the agility test are 45 lbs and completing cardio with a weighted backpack is an optimal way to simulate the stress of the weight vest

Strength Training

A specific consideration with strength exercises is to complete the movement with proper form. Not using the proper form increases the risk of injury and will minimize the effectiveness of the exercise. If proper form cannot be accomplished at the current weight used, the weight for the exercise should be decreased, transitioned to body weight only, or the exercise could become assisted if necessary. When trying a new exercise, make sure to look at provided pictures or videos online to learn the proper form.

2-3 days/week, 3-5 sets, 10-15 reps, low-moderate intensity (30%-50% MHR)

(Bilateral = both sides together, Both sides = each side separately, Alternating = each side separately and alternating sides with each rep)

Back (complete all every "back" day)		
Back Extensions	With a medicine ball or other weighted object	Bilateral
Seated Rows (Narrow & Wide Grip)	On machine or with resistance bands	Bilateral or both sides
Plank	<i>(optional: movement from elbows to hands throughout exercise)</i>	2 minutes
Dead Lifts	With barbell, dumbbells, or kettlebell	Bilateral
Wide Grip Pull-Ups	Unassisted or assisted machine	Bilateral

Shoulders – Arms – Chest (pick 6 per "upper body" day)		
Hammer Curls	Upright or bent over bench with dumbbell or weighted object	Both sides
Lateral Raises	With dumbbell or weighted object	Both sides
Triceps Extensions	With barbell bent over bench, resistance bands, or resistance machine	Bilateral or both sides
Push-Ups	<i>(optional: add weight on back)</i>	
Horizontal Shoulder Adduction	With machine or resistance bands	Both sides
Horizontal Shoulder Abduction	With machine or resistance bands	Both sides
Shoulder Shrugs	With dumbbells or resistance bands	Bilateral
Bent Over Rows	With dumbbells or resistance bands	Bilateral or both sides
Chest Press	With dumbbells alternating or with barbell	Bilateral or both sides

Core (pick 5 per "core" day)		
Crunches	Bodyweight	Bilateral
Plank Circles	Bodyweight	1.5 minutes, bilateral
Russian Twists	With weighed object, alternating	Both sides
Leg Lifts	Bodyweight	Bilateral
Flutter Kicks	Alternating	Both sides
Seated Knee Tucks	Bodyweight	Bilateral
Side Plank	Bodyweight	2 minutes, both sides
Spiderman	Bodyweight	Both sides

Legs – Glutes (pick 6 per "leg" day)		
Squats	Weighted	Bilateral
Leg Press	Weighted	Both sides or bilateral
Lunges	Weighted, alternating	Both sides
Jump Squats	Bodyweight	Bilateral
Side-Leg Lunge	Bodyweight	Both sides, alternating
Wall Sit	Body weight	3 minutes
Laying Down Side Leg Raise	Body weight	Both sides
Standing Side Leg Raises	Bodyweight	Both sides, alternating
Lunge Step-Up	Bodyweight	Both sides, alternating
Calf Raises	Bodyweight or weighted	Bilateral or both sides
Hamstring Curls	Weighted or with machine	Bilateral or both sides
Glute Kickback	With resistance band or resistance machine	Both sides
Side Squat Shuffle	With resistance band	Both sides, alternating

Flexibility

5 days/week, hold for 30 secs – 1 min, stretch every muscle group emphasizing muscle group participating in that day's strength exercises

Back	Shoulders – Arms – Chest
Supine Spinal Twist	Cross-Body Shoulder Stretch
Child's Pose	Arm on Wall Bicep Stretch
Toe Touch	Upper Trap (Neck) Stretch
Foam Roller – Upper Back	Overhead Triceps Stretch
	Bicep Stretch (on ground)
	Wrist Extension
	Wrist Flexion

Core	Legs – Glutes
Cobra Stretch	Hamstring Stretch
Standing Oblique Stretch	Quad Stretch
Bridge Pose	Sitting Calf Stretch – with towel or resistance band
	Adductor Stretch – via side lunge
	Butterfly Stretch
	Piriformis Stretch
	Seated Glute Stretch
	Foam Roll – Glutes, IT Band, Adductors, Hamstrings, & Quads

Example Weekly Exercise Plan (6 months – 1-year preparation)

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Warm Up & Cool Down	5 min warm-up & cool down	-	-	-	-	-	-
Flexibility	15 min stretching (focused upper body)	15 min stretching	15 min stretching (focused lower body)	15 min stretching	15 min stretching (focused core & back)	15 min stretching	20 min stretching
Strength	Upper Body		Lower Body		Core & Back		
Cardiovascular	30-45 min	45 min-1hr	30-45 min	45 min-1 hr		30-45 min	
Other							Yoga/ Light Activity 1 hr

Example Weekly Exercise Plan (less than 3 months preparation)

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Warm Up & Cool Down	5 min warm-up & cool down	-	-	-	-	-	-
Flexibility	15 min stretching (focused upper body)	15 min stretching (focused lower body)	15 min stretching (focused core & back)	15 min stretching (focused upper body)	15 min stretching (focused lower body)	15 min stretching (focused core & back)	20 min stretching
Strength	Upper Body	Lower Body	Core & Back	Upper Body	Lower Body	Core & Back	
Cardiovascular	30-45 min	30-45 min	30-45 min	30-45 min	30-45 min	30-45 min	
Other							Yoga/ Light Activity 1.5 hr

Functional Training

Functional training can be beneficial to complete practical, repetitive tasks of a firefighter. Also, movements that are completed many times over a long span of time could potentially cause injury if the proper amount of strength and flexibility is not maintained. Therefore, below are some exercises that could lower the risk of injury and prepare an individual for physical tasks of a firefighter. Functional training tasks can be added to workouts if desired.

Task: Stepping up and down on truck/equipment

Step-ups on stairs or a stable box **(3-5 sets, 10-15 reps)**

Task: Carrying heavy loads

Fill storage box with weight and carry from one part of house/apartment to another **(5 sets, 1-2 reps)**

Task: Endurance with full equipment

Wear weighted backpack and walk at a fast pace **(30 – 45 min)**

Task: Handling patient

Squats with alternating picking up a moderately heavy box **(3-5 sets, 10-15 reps)**

Female Specific Considerations

Need to have an emphasis on upper body strength

An emphasis on upper body strength exercise is crucial for females because they tend to have less upper body strength compared to males. Upper body strength primarily roots from arms, shoulders, and upper back muscles. A method of overcoming this limitation would be to complete upper body strength exercises multiple days a week within the same exercise schedule. This can be accomplished by completing less lower body and core exercises, and more upper body exercises on strength training days.

Grip strength

Females tend to have smaller hands on average and that can make grip strength an issue when carrying large and/or heavy objects. Therefore, grip strength can be increased using hand grip equipment to strengthen smaller muscles in the hand and forearm that are under-utilized in large-muscle, arm strength exercises.

Risk of Knee Injury

On average, females have a higher risk of knee injury compared to males. There are various factors that can cause knee injuries in females including increased Q-angle, unbalanced muscle utilization, and leg position when landing from a jump. These three factors cause a greater risk of knee injury, specifically anterior cruciate ligament (ACL) injury.

The Q-angle is defined by the angle from the anterior superior iliac spine (ASIS) on the pelvis to the center of the patella, and from the center of the patella to the tibial tuberosity. Characteristically, women have a greater Q-angle, which places greater stress on the knee joint by lacking proper force absorption. It has also been seen that that women over utilize their quad muscles when they run or jump, as compared to males who tend to equally utilize the quad and hamstring muscles. Finally, women are prone to landing a jump with their knees in a straighter position and their feet pointed inwards. This position causes reduced shock absorption through the knee joint. The combined factors produce a greater risk for knee injury in women. Although, the limitations in muscle utilization and form from landing a jump can be corrected through intentionality in training.

Age Specific Considerations

Four main age specific considerations include:

1. Limited flexibility
2. Reduced physical endurance
3. Need for strength toning
4. Prone to shoulder, knee, and back injuries

The four age specific considerations could be combatted by performing specific exercises and stretches that would give greater range of motion, increased physical endurance, greater strength, and prevention of common injuries.

Aerobic exercise is important in maintaining knee strength and preventing potential injuries in the future. Although, some forms of aerobic exercise such as running or jogging could contribute to knee pain due to the repetitive force being placed upon the knee. This means that running/jogging should not be the only mode of aerobic exercise utilized. It can still be incorporated into aerobic exercise, just be careful not to use it in excess. Other options for aerobic exercise could include swimming, biking, elliptical, or other exercises that reduce force placed directly on the knee.

Exercises (completed on both sides) that will assist in strengthening the rotator cuff and potentially preventing injury:

Exercise
Internal and External Rotation Dumbbell Curls
Abduction Shoulder Dumbbell Curls
Forward Flexion Shoulder Raises/Forward Raises
Pendulum Exercise – Circle and Reverse Circle
Pendulum Exercise – Crosses

Exercises that will assist in strengthening the knee and potentially preventing injury:

Exercise
Bodyweight Squat
Stabilization Lunge (<i>both sides</i>)
Glute Bridge
Single Knee Extension (with towel under knee) (<i>both sides</i>)

Stretches (completed on both sides) that will assist in strengthening the knee and potentially preventing injury:

Exercise
Glute Stretch
Side-Leg Lunge
Half-Kneeling Hip Flexor Stretch
Hamstring Stretch
Quad Stretch
Calf (gastrocnemius) Stretch
Calf (soleus) Stretch

Exercises (completed on both sides) and stretches that will assist in strengthening the back and potentially preventing injury:

Exercise
Half-Kneeling Hip Flexor Stretch
Bird Dog
Dead Bug
Glute Bridge
Side Plank

How to Calculate Max Heart Rate Percentage (MHR %)

The MHR % and intensity scale can be utilized to monitor intensity of a workout. Cardiovascular training should be completed at moderate to high intensity (50%-80% MHR). Strength training should be completed at low to moderate intensity (30%-50% MHR). By monitoring MHR percentage, an individual could become better at assessing intensity without having to do the calculations.

- $220 - \text{age} = \text{Max Heart Rate (MHR)}$
 - *Example: $220 - 25 = 195$*

- Calculating % HR
 - *Example: $60\% \text{ Max Heart Rate} = 0.6 \times 195 = 117 \text{ (HR)}$*

Intensity Scale

Rating	MHR %	Descriptor
0	0 %	Rest
1	10 %	Ver, Very Easy
2	20 %	Easy
3	30 %	Moderate
4	40 %	Somewhat Hard
5	50 %	Hard
6	60 %	-
7	70 %	Very Hard
8	80 %	-
9	90 %	-
10	100 %	Maximal

Healthy Meal Recommendations

Dietary Intake Recommendations

Nutrient	Quantity Per Day
Energy	2,000 Calories
Protein	40-50 grams
Fat	40-70 grams
Carbohydrates	220-320 grams
Sugars	<25 grams (women) & <38 grams (men)
Sodium	<2,300 milligrams
Dietary Fiber	25-30 grams

Examples of Healthy Options

Protein

Eggs, cottage cheese, almonds, chicken breasts, greek yogurt, milk, peanut butter, edamame, canned tuna, sunflower seeds, beans and rice, lentils, oats, pumpkin seeds, salmon, turkey.

Fat

Avocado, cheese, dark chocolate, eggs, oily fish, nuts, chia seeds, extra virgin olive oil, full-fat yogurt.

Carbohydrates

Sweet potatoes, bananas, quinoa, whole grain oats, apples, oranges, blueberries, buckwheat, grapefruit, chickpeas, kidney beans, brown rice.

Low Sugar

Fresh fruit, dried fruit, dark chocolate, chia seeds.

Low Sodium

Fresh or frozen beef, lamb, pork, poultry, and fish, eggs, low-sodium peanut butter, dry beans and peas (not canned), low-sodium canned fish, drained (water or oil) canned fish or poultry, milk, yogurt, low-sodium cheeses, fresh potatoes, homemade soups (without added salt), vegetable oils and low-sodium sauces and salad dressings.

Dietary Fiber

Raspberries, pear, apple (with skin), banana, orange, strawberries, broccoli, brussels sprouts, potato (with skin), carrot, cauliflower, whole-wheat noodles, barley, oatmeal, brown rice, lentils, black beans, baked beans, almonds.

Sleep Recommendations

Sleep is a necessary step in the body's way to recovery throughout the day. Without enough sleep, the body cannot consolidate memories, grow muscle, repair tissue, or do many other vital functions. According to the National Sleep Foundation, there are recommended sleep durations based on age to function at the best cognitively and physically. The recommended ranges may vary slightly between individuals, but extreme variances could be detrimental to an individual if not corrected.

National Sleep Foundation's Sleep Duration Recommendations:

Age	Recommended	May be Appropriate	Not Recommended
Young Adults (18-25 years)	7-9 hours	6 hours OR 10-11 hours	Less than 6 hours OR More than 11 hours
Adults (26-64 years)	7-9 hours	6 hours OR 10 hours	Less than 6 hours OR More than 10 hours
Older Adults (65+ years)	7-8 hours	5-6 hours OR 9 hours	Less than 5 hours OR More than 9 hours