



Fort Collins Police Services Applicant Physical Readiness Handbook

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SECTION 1: BACKGROUND

Fort Collins Police Services (FCPS) requires applicants for law enforcement positions to have minimum levels of physical readiness to undergo training and perform the job. This handbook presents information you need about the physical abilities necessary for acceptance to the Department. FCPS applicants must be able to perform the physically demanding functions of the job. To ensure that applicants can safely perform those physical tasks, FCPS has developed a physical fitness test battery called the Physical Readiness Battery (PRB) and associated standards for applicants.

Fort Collins Police Services (FCPS) has long recognized that the physical fitness levels of law enforcement personnel relate to job effectiveness and overall well being. The events of 9/11 were a somber reminder that a law enforcement officer is often the critical first responder. Therefore, your fitness is just not your concern, but one for your agency and the public. You may be faced with increased physical demands, possibly leading to stress and fatigue affecting overall health. The rationale for establishing physical readiness/fitness standards for law enforcement job classifications is that Officers are called upon to perform important, often critical, job functions. Officer's physiological capabilities and readiness bear directly upon effectiveness, their safety, and the safety of co-workers and citizens. As such, your physical fitness is the basis for your physical readiness to perform the essential, although infrequent, physical tasks of the job.

FCPS has acknowledged this situation with a renewed and updated focus on the physical fitness program to improve the physical readiness and well being of all law enforcement personnel. FCPS conducted a validation study to identify the physically demanding tasks of the job and determine the underlying physical abilities or fitness areas required to perform those tasks. A large number of randomly selected Officers were surveyed and the following tasks were rated as the most physically demanding tasks of the job:

- Walking and standing for extended periods
- Pursuit running for short and long distances and over uneven terrain
- Light, moderate and heavy lifting and carrying
- Pulling, pushing and dragging heavy objects

- Climbing over, under and around obstacles
- Vaulting and jumping over low and high obstacles
- Bending and reaching
- Crawling, stooping and dodging around obstacles
- Balancing oneself
- Ability to use force for short and long periods of time
- Use of control holds, restraining devices and hands and feet for self defense
- Forced entry using pushing, pulling, prying and chopping

The inability to perform these tasks would not only result in the failure to perform one's duty but also to place yourself and others at risk for potential injuries and life threatening consequences. To assess one's ability to perform necessary tasks we have developed a job-related physical readiness battery (PRB) that consists of seven fitness tests that measure the underlying physical fitness necessary to do the job. This Handbook provides you with tools to ensure you have the fitness necessary to perform the physically demanding tasks of the job and prepare to meet the physical readiness standards to be a Fort Collins Police Officer.

The Physical Readiness Battery (PRB) is job-related. It measures the underlying physical abilities necessary to perform training and job tasks. The standards predict an individual's ability to perform the essential and critical physical tasks of the job at a minimum level of safety and effectiveness. You will be required to meet the PRB standards to be selected as a Fort Collins Police Officer.

WHY IS PHYSICAL FITNESS IMPORTANT?

First, physical fitness is important because it underlies and predicts an individual's capability to perform essential job tasks. It is job related and a bona fide occupational qualification (BFOQ). Fitness determines your physical readiness.

Secondly, maintaining a professional image has a direct impact as to how the public judges officers. This judgment affects how effectively "police presence" produces a deterrent effect. Your physical appearance is related to your fitness.

Thirdly, physical fitness is important to minimize risk for a variety of health problems - many of which can also affect job performance. The fitness areas required to do the job are the same that are necessary for good health. Cardiovascular disease, high blood pressure, lung cancer, colon cancer, and diabetes are almost at epidemic proportions in our country. These conditions are not communicable illnesses from viruses or bacteria; they are conditions related to poor fitness and lifestyle choices.

WHAT PHYSICAL FITNESS AREAS ARE IMPORTANT FOR READINESS?

Physical fitness includes the readiness to perform the strenuous and critical physical tasks defined for the job. The physical fitness areas that have been determined to underlie the capabilities to do your job consist of seven specific areas.

1. **Aerobic power or cardiovascular endurance** is the ability to sustain activity for a period of time. It requires efficient heart, respiratory, and vascular systems. It is an important area for performing job tasks such as conducting foot pursuits and use of force situations lasting more than two minutes.

2. **Anaerobic power** is the ability to make short intense bursts of effort. It is an important area for performing job tasks such as sprint pursuit situations.
3. **Upper body absolute strength** is the upper body's ability to make maximal efforts against a resistance. It is important for performing physical tasks that require climbing, lifting, carrying, pulling, and pushing.
4. **Upper body muscular endurance** is the ability to make repeated muscular contractions with the upper body without becoming unduly fatigued. It is important for tasks requiring an officer's use of force and arrest control techniques.
5. **Leg explosive strength or power** is the ability to jump with power and to make short intense bursts of effort. It is an important area for performing job tasks such as jumping over obstacles and sprinting in pursuit situations.
6. **Agility** is the ability to make quick movements while sprinting. It is important for making movements and changes of direction around obstacles during pursuits.
7. **Trunk or abdominal muscular endurance** is the ability to repeat muscular contractions with the abdominal area without becoming unduly fatigued. Your abdomen is the fulcrum of your body and is important in many tasks involving lifting, pulling, climbing, and dragging.

There are other areas of physical fitness to include body composition and flexibility. Those areas are important for overall fitness; however, they were not found to be predictive of how well an individual can perform the duties of a Fort Collins Police Officer.

HOW WILL PHYSICAL READINESS BE MEASURED?

There are seven physical fitness assessment tests in the Physical Readiness Battery (PRB).

1. **Vertical jump test.** This measures leg power. The test measures how high you can jump from a standing position.
2. **1 Repetition Maximum (RM) Bench Press.** This measures the absolute strength of the upper body. The test consists of lying on a bench and pushing up as much weight as you can one time.
3. **Agility run.** This measures ability to change direction while sprinting. The test consists of sprinting and dodging around obstacles as fast as possible over a 180 foot course.
4. **1 minute sit up test.** This measures the abdominal or core muscular endurance. The test consists of doing as many bent leg sit ups as you can in one minute.
5. **300 meter run.** This measures anaerobic power or the ability to make intense bursts of effort for a short time period or distance. The test consists of sprinting 300 meters as fast as possible.

- 6. **Maximum push up test.** This measures the muscular endurance of the upper body. The test consists of doing as many push ups as possible.
- 7. **1.5 mile run.** This measures aerobic power or cardiovascular endurance (the ability to have stamina over time). The test consists of running/walking 1.5 miles as fast as possible.

WHAT PHYSICAL READINESS BATTERY (PRB) STANDARDS MUST I MEET?

You will be given the tests in the following sequence. There will be rest periods between each event. Each test is scored separately and you must meet the standard on each and every test of the PRB. The standards are as follows:

PHYSICAL READINESS TEST STANDARDS

<u>TEST</u>	<u>STANDARD/GOAL</u>
Vertical Jump	17.0 inches
1RM bench press Push	66% of body weight or 115 lbs.
Agility run	19.5 seconds
1 minute sit up	35
300 meter run	64 seconds
Maximum push up	16
1.5 mile runs	15:48

The standards are the same whether you are male or female and are irrespective of age. The physical demands of the job are the same regardless of demographic characteristics. Likewise, from a legal perspective a single standard is required.

SECTION 2: PREPARATION FOR TESTING

Fort Collins Police Services has made a commitment to the total fitness of its law enforcement personnel in order to ensure physical readiness. The PRB testing is intended to compliment a total fitness approach to the physical readiness of personnel. Total fitness requires the development and maintenance of an active lifestyle to include exercise, nutrition, and stress management.

You must first prepare yourself to undergo the fitness testing.

HOW DO I PREPARE FOR THE TESTS?

The first step is to see if you are physically ready to safely engage in physical activity. Individuals who are apparently healthy can usually participate in mild or moderate exercise (such as walking) without any problems and without the need of a medical examination. The term “apparently healthy” refers to the absence of chronic diseases such as hypertension, heart disease, diabetes and the like. There is a simple questionnaire called the PAR Q (Participant Activity Readiness Questionnaire) that will provide an index of whether getting a medical examination or physician’s clearance may be needed if you have not done so already. Fill out the PARQ and then follow the suggestions at the bottom of the form. Answer each question “yes” or “no.” If there are any “yes” answers, you should call or visit your doctor before beginning an activity program.

PAR Q

PAR-Q is designed to help you help yourself. Many health benefits are associated with regular exercise and the completion of the PAR-Q is a sensible first step to take if you are planning to increase the amount of physical activity in your life. For most people physical activity should not pose any problem or hazard. PAR-Q has been designed to identify the small number of adults for whom physical activity might be inappropriate or those who should have medical advice concerning the type of activity most suitable for them. Common sense is your best guide in answering these few questions. Please read them carefully and mark YES or NO for each question as it applies to you.

YES NO

- ___ ___ 1. Has the doctor ever said you have a heart condition and that you should only do physical activity recommended by a doctor?
- ___ ___ 2. Do you feel pain in your chest when you do physical activity?
- ___ ___ 3. In the past month, have you had chest pain when you were not doing physical activity?
- ___ ___ 4. Do you lose your balance because of dizziness? or do you ever lose consciousness?
- ___ ___ 5. Have you ever been told by your doctor at your last exam that your blood pressure was too high?
- ___ ___ 6. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by strenuous physical activity?
- ___ ___ 7. Do you have diabetes?
- ___ ___ 8. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
- ___ ___ 9. Has the doctor ever said you have an abnormal electrocardiogram (ECG)?
- ___ ___ 10. Do you know of any other reason why you should not do physical activity?

If you answered YES to one or more of the above questions: If you have not recently done so, consult your personal physician by telephone or in person **BEFORE** increasing your physical activity and/or taking a fitness test. Tell the physician what questions you answered YES.

After a medical consultation, seek advice from your physician as to the suitability for:

1. Unrestricted physical activity, probably on a gradual increasing basis or
2. Restricted and supervised activity to meet your specific needs, at least on an initial basis. Check your community for special programs or services.

If you answered NO to all of the above questions: If you answered the questions on the PAR-Q accurately, you have reasonable assurance of your present suitability for:

1. A graduated exercise program - - A gradual increase in proper exercise promotes good fitness development while minimizing or eliminating discomfort.
2. An exercise test - - Simple tests of fitness may be undertaken if you so desire.

Postpone exercise or exercise testing: If you have a temporary minor illness, such as a common cold.

*Note: Adapted from PAR-Q Validation Report (modified version) by the British Columbia Department of Health, D.M. Chisholm, M.I. Collins, W. Davenport, N. Gruber, L.L. Kulak, 1975, *British Columbia Medical Journal*, 17.*

WHERE DO I START?

If you answered no to all the questions of the PARQ and have been exercising on a regular basis (at least 3 times a week engaging in strenuous activity that increases your heart rate and perspiration) then you may move on the Section 3- Fitness Assessments. If you answered yes to any of the questions and have not been exercising then you first may want to consider getting a health or medical screening. You also can initiate a starter program. That program has two components: incorporating activity into daily living and a walking pre assessment program.

Incorporating activity into daily living

This involves nothing more than looking for opportunities to expend energy in physical activity. Examples are taking the stairs instead of an elevator. Move around the house or office whenever possible and instead of calling people in other rooms, get up to see them. Throw away the TV remote. Rather than employing someone to always do the yard work, occasionally do it yourself. Some people will deliberately park their car several blocks from work so that they have to walk a further distance to the office.

Another approach to being more active is to try to decrease sedentary activities. A simple guideline is to stand instead of sitting and walk instead of standing. While there is nothing wrong in sedentary activities such as reading and watching TV, there are substitute activities. For example, you could get books on tape and listen to a book while walking. Instead of sitting around and talking when visiting friends try doing a “walk and talk” together. The bottom line is that by seeking opportunities to be more active and expend energy, a movement habit will develop, which helps to set the stage for more formal and structured activity.

Walking pre-assessment starter program

If you answered “yes” to one or more of the PAR-Q questions or if you had some additional screening that suggests that you may have some risk for activity, we recommend that you perform an eight week walking starter program before taking the fitness assessments. The walking program below is a gradually progressive program. Each time you walk:

- Warm up before you start your walk by swinging the arms and performing mild stretches.
- Start slowly then pick up the pace. Walk briskly without getting out of breath.
- Slow your pace for the last two minutes to serve as a cool down.
- The most important dimension is the duration (time) but try to make the distance for a given time if possible.

WALKING STARTER PROGRAM

Week	Distance	Duration Minutes	Frequency per Week
1	½ mile	12:00	3-4
2	¾ mile	18:00	3-4
3	1 mile	23:00	3-4
4	1 mile	21:00	3-4
5	1 mile	19:00	4
6	1.5 mile	26:00	4
7	1.5 mile	24:00	4-5
8	2.0 mile	33:00	4-5

If you find that the plan for week 1 is too easy, start the program at a level you are comfortable with. Once you have completed week 8, test yourself with the 1-mile walk test. Based on the results you can determine if you are ready for the regular fitness assessments.

One-Mile Walk

In this test you measure the time it takes to walk a mile and your heart rate at the end of the test.

Equipment

- Stopwatch
- Measured one mile level course

Procedural tasks

1. Walk 1 mile as fast as possible. Running or jogging is not permitted.
2. When you finish the mile, note your time and immediately find either your radial or carotid pulse. Take the pulse for 6 seconds, and multiply the count by 10. It is critical that you record your pulse as soon as you cross the finish line in order to get an accurate exercise heart rate.
3. Cool down by walking slowly for 5 minutes.
4. Compare your time and heart rate with the walk test norms. Find your posttest pulse rate on the left side of the chart. Read across until you reach the column corresponding to your age and gender. Adjust that time for your body weight by adding or subtracting 15 seconds for every 10 pounds under or over 175 pounds for men and 125 pounds for women.
5. Note that for a given heart rate there are different times based on age and gender. This is because maximal heart rate decreases with age. A younger person is working at a 10 lower percentage of his or her maximum cardiovascular endurance than an older individual would be at the same heart rate.
6. Here's an example of how to use the walk norm chart. A 35 year-old female weighing 135 pounds completes the one mile walk in 16:20. Her six-second pulse at the end of the run was 13. She multiplies 13 by 10, for a posttest heart rate of 130. Reading across the table from 130 to the column for females age 30-39, we find a time of 18:48. Since our subject weighs 135 pounds, we subtract 15 seconds to find her "standard" is 18:33. She can safely take the fitness tests in Section 3.
7. If your time for the 1 mile walk is equal to or less than the time on the chart for your posttest heart rate then you can safely take the fitness tests in Section 3. If not we recommend that you stay with week 8 program for an additional four weeks and retest.

ONE MILE WALK NORMS

	MALE					FEMALE				
	20-29	30-39	40-49	50-59	60+	20-29	30-39	40-49	50-59	60+
	* Assumes weight of 175 lbs.					* Assumes weight of 125 lbs.				
Heart rate										
110	19:36	18:21	18:05	17:49	17:55	20:57	19:46	19:15	18:40	18:00
120	19:10	17:52	17:36	17:20	17:24	20:27	19:18	18:45	18:12	17:30
130	18:35	17:22	17:07	16:51	16:57	20:00	18:48	18:18	17:42	17:01
140	18:06	16:54	16:38	16:22	16:28	19:30	18:18	17:48	17:18	16:31
150	17:36	16:26	16:09	15:53	15:59	19:00	17:48	17:18	16:48	16:02
160	17:19	15:58	15:42	15:26	15:30	18:30	17:18	16:48	16:18	15:32
170	16:39	15:28	15:12	14:56	15:04	18:00	16:54	16:18	15:48	15:04

Weight _____
 Time _____ adjusted for weight
 Heart rate _____
 Met norm _____ did not meet norm _____

Developing a new behavior requires getting ready, making a commitment and getting started. Following this process enables you to get more physically active. Once this lifestyle becomes a habit you can consider a more structured and strenuous exercise program that will further maximize the health benefit and significantly improve your level of physical fitness.

SECTION 3: ASSESSING PHYSICAL READINESS/FITNESS LEVELS

If you are a regular exerciser or have completed the starter program the next step is to see where you stand on the Physical Readiness Battery Test standards.

HOW DO I ASSESS MYSELF ON THE FITNESS TESTS?

Once you have been following the training programs for six weeks you should be ready to assess yourself on the fitness tests. You can take the tests all at one time, which is the process you will undergo when the agency administers the tests, or you can space them out over several days. If you take them in one day we recommend the following sequence:

1. Warm-up for 3 minutes
2. Vertical jump
3. 1 RM bench press
4. Agility run
5. Rest for 5 minutes
6. Sit up test
7. Rest for 5 minutes
8. 300 meter run
9. Rest for 5 minutes
10. Push up test
11. Rest for 30 minutes
12. Warm-up for 2 minutes
13. 1.5-mile run
14. Cool down for 5 minutes

Vertical jump

There are two methods depending upon whether you have access to the jump Vertec at the Department.

Equipment

- Yardstick taped to a smooth wall and chalk dust or chalk for marking jumping height.
- OR the Department Vertec

Procedural tasks with yard stick

- Stand with one side toward the wall and reach up as high as possible to mark your standing reach.
- Step back with one foot, bring it forward and jump as high as possible. Or you may jump with both feet without taking a step. Mark the spot on the wall above your standing reach mark.
- Record the difference to the nearest 1/2 inch between your standing and jumping heights.
- Your score is the best of three trials.

Procedural tasks with a Vertec.

- Subject stands under the Vertec reaches up as high as possible keeping bicep against the ear, and Coordinator adjusts the frame to mark his/her standing reach.
- Subject takes one warm up jump then makes three jumps for a score.
- Coordinator moves tabs to one side to reduce resistance.
- Subject takes one step back with either foot, steps forward then jumps as high as possible hitting the highest vane OR a subject may jump with both feet and not take a step.
- Score is the inches to the nearest 1/2 inch.
- The best of three (3) trials is the score.

One repetition maximum (1RM) bench press

Equipment

- Bench
- Forty-five pound straight bar and weights

Procedural tasks with free weights

- Use two to three spotters
- If you can estimate your maximum weight for the 1RM bench press, start with about one half of that weight. If not, males should start with about one-half of their body weight, and females with 45 pounds (the weight of the bar).
- Perform 3-5 repetitions with that weight as a warm up.
- Receive a lift off from the spotters or you may remove the bar from the uprights by yourself.
- Push the weight that has been lowered to your chest by the spotters. The lift **does not start from the up position but from the down position**. Once it touches your chest push the weight up to arms length, exhaling as the movement is performed.
- Increase the weight in ten or more pound increments until you reach your maximum. The first three or four repetitions serve as warm-up lifts in order to prevent muscle injury and to prepare you for a maximal lift on the fourth or fifth effort.
- The score for this test is the maximum number of pounds lifted in one repetition.
- Divide the 1RM score by your body weight to get the bench press ratio score.
- If you use a chest press machine, follow the same procedure.

Alternative testing

If you have not been doing weight training there is a potential risk of injury trying to do a maximum lift. An option is to use a sub-maximal weight and do as many repetitions as you can then compare the number of repetitions to the chart below to get an estimated 1 RM. We recommend that males use ½ your body weight and females use 1/3 your body weight. Find the weight on the chart for the number of repetitions that you did and go across to the left hand column for the estimated 1RM.

ESTIMATED 1 RM WEIGHTS (in pounds)
RPS=repetitions

1RM	2RPS	4RPS	6RPS	8RPS	10RPS	12RPS	14RPS	16RPS	18RPS	20RPS
200	190	180	170	160	150	140	130	120	110	100
195	185	175	165	156	146	136	126	117	107	97
190	180	171	161	152	142	133	123	114	104	95
185	175	166	157	148	138	129	120	111	101	92
180	171	162	153	144	135	126	117	108	99	90
175	166	157	148	140	131	122	113	105	96	87
170	161	153	144	136	127	119	110	102	93	86
165	156	148	140	132	123	115	107	99	90	82
160	152	144	136	128	120	112	104	96	88	80
155	147	139	131	124	116	108	100	93	85	77
150	142	135	127	120	112	105	97	90	82	75
145	137	130	123	116	108	101	94	87	79	72
140	133	126	119	112	105	98	91	84	77	70
135	128	121	114	108	101	94	87	81	74	67
130	123	117	110	104	97	91	84	78	71	65
125	118	112	106	100	93	87	81	75	68	62
120	114	108	102	96	90	84	78	72	66	60
115	109	103	97	92	86	80	74	69	63	57
110	104	99	93	88	82	77	71	66	60	55
105	99	94	89	84	78	73	68	63	57	52
100	95	90	85	80	75	70	65	60	55	50
95	90	85	80	76	71	66	61	57	52	47
90	85	81	76	72	67	63	58	54	49	45
85	80	76	72	68	63	59	55	51	46	42
80	76	72	68	64	60	56	52	48	44	40
75	71	67	63	60	56	52	48	45	41	37
75	71	67	63	60	56	52	48	45	41	37
70	66	63	59	56	52	49	45	42	38	35
65	61	58	55	52	48	45	42	39	35	32
60	57	54	51	48	45	42	39	36	33	30
55	52	49	46	44	41	38	35	33	30	27
50	47	45	42	40	37	35	32	30	27	25
45	42	40	38	36	33	31	29	27	24	22
40	38	36	34	32	30	28	26	24	22	20
35	33	31	29	28	26	24	22	21	19	17
30	28	27	25	24	22	21	19	18	16	15
25	23	22	21	20	19	17	16	15	14	12
20	19	18	17	16	15	14	13	12	11	10
15	10	9	8	8	7	7	6	6	5	5
10	5	5	4	4	4	4	3	3	3	2

Agility run

Equipment

- Two lines 30 feet apart
- Four cones, one on starting line and one on turn line, others spaced 10 feet apart in a line
- Stop watch

Procedural tasks

- a) Lie on the ground with fingertips behind the start line.
- b) At the command "Go", stand up, sprint to the other line, place one foot over the line then sprint back to the start line.
- c) Make a left turn around the first cone then zig zag in a figure eight fashion around the four cones to the turn line and back to the start line.
- d) Sprint up and back as described in (b).
- e) Score is time in seconds and tenths.
- f) Do two trials. Score is the faster time.

1 minute sit up

Equipment

- Exercise mat
- Stopwatch.

Procedural tasks

- a) Start by lying on your back, knees bent, heels flat on the floor. Finger tips stay behind the ears.
- b) Have a partner hold your feet down.
- c) Raise your upper body until your face is perpendicular to the surface of the floor. Touch your elbows to your knees then return to the starting position before beginning the next sit up.
- d) You cannot raise the buttocks from the ground and when returning to the down position the shoulder blades must touch the ground.
- e) Perform as many correct sit-ups as possible in one minute.

300 meter run

Equipment

- Marked course of 300 meters (328 yards or 984 feet). On a 440 yard track the 300 meter line would be 112 yards (336 ft.) from the finish line.
- Stop watch

Procedural tasks

- a) Warm up thoroughly before test.
- b) Run the 300 meters as fast as possible.
- c) Record the time it took to complete the run.

Maximum push up

Procedural tasks

- a) Start in the front leaning rest position, with the body in a generally straight line from the shoulders to the ankles. Hands are slightly more than shoulder width apart; feet are up to 12" apart.
- b) Lower yourself until the upper arms are parallel to the ground, and then push up again. If possible, have your partner place their fist underneath your chest and for each repetition go down and touch their fist with your upper sternum.
- c) Perform as many correct push ups as possible. There is no time limit.

1.5 mile run

Equipment

- 440 yard/400 meter track or a marked, level course. With a 400 meter track the test would be 6 laps plus 14 yards.
- Stop watch.

Procedural tasks

- a) Warm up.
- b) Cover the distance as fast as possible.
- c) Score is time to run the course.
- d) A cool down is required after running.

Use the Physical Fitness Assessment Chart below to profile your scores.

PHYSICAL READINESS ASSESSMENT CHART

1. Height _____ in.
 2. Weight _____ lbs.
 3. Vertical Jump _____ in.
 4. 1 RM bench press _____ lbs _____ ratio (weight pushed divided by body weight)
 5. Agility run _____ sec.
 6. 1 minute sit up _____ n
 7. 300 meter run _____ sec.
 8. Push up _____ n
 9. 1.5 mile run _____ min:sec
-

SECTION 4: DESIGNING AN EXERCISE PROGRAM

HOW DO I TRAIN FOR THE TESTS?

Once you have determined that it is safe to exercise and where you currently stand on the fitness standards the next step is start a training program to increase each fitness area to meet the standards. While the focus is on increasing your fitness level to meet the applicant standard, the program is also designed to increase your total fitness throughout your career. There are eleven (11) well known and proven principles of exercise for following a fitness program. These principles of exercise tell you how to exercise correctly and safely.

PRINCIPLE #1: REGULARITY

The weekend-warrior approach to fitness training will probably produce more injuries than desirable results. To be effective, a fitness program must be followed regularly. Trying to get all the training you need in irregular bursts doesn't work. Rather, your training should be consistent throughout the week, the month, the year, and your life.

Fitness research indicates that it takes a minimum of three exercise sessions per week to achieve cardiovascular training. There are indications that as few as two strength and anaerobic training sessions per week are necessary to see gains in that area. Experts tell us that an energy system or muscle group will begin to de-condition after 96 hours of inactivity. While this change will be imperceptible, it does give us a parameter for regularity. As a rule of thumb, plan your workouts so there is no more than 96 hours between hard training sessions for the same energy system or muscle group.

PRINCIPLE #2: RECOVERY

The body needs time to recover between hard exercise sessions. As a general rule, allow 48 hours for that recovery between hard exercise sessions. For example, if you lift weights for the upper body on Monday, you should wait until Wednesday before training those muscles again. However, working out the lower body on Tuesday will not violate this principle. The threshold values for the frequency of training, e.g., three times a week for aerobic power, were developed using a convention familiar to everyone. However, defining a week as a seven day period beginning on Sunday and ending on Saturday is not always applicable to law enforcement officers. Your training week may be seven, eight or even nine days long. The key is that your program is regular and provides enough recovery time.

PRINCIPLE #3: REVERSIBILITY

Fitness is a "use it or lose it" proposition, and most training adaptations are reversible. It takes longer to achieve a level of fitness than it does to lose it. Some setbacks in your training regimen are almost unavoidable. So the more "money in the bank" that you have stored up, the more able you will be to withstand those periods when you are unable to train. You must maintain your training.

PRINCIPLE #4: OVERLOAD

For a training program to have an effect, the demands placed on the body must be greater than those of your day-to-day activities. You'll never improve your cardiovascular endurance if your most strenuous exercise is walking from the patrol car to the headquarters building (although a brisk walk might produce a training effect). Nor will you increase your strength if you never overcome any more resistance than lifting a coffee cup. For each part of your program, as your fitness level improves you must increase the demands of your training to ensure overload.

PRINCIPLE #5: PROGRESSION

There are two aspects of progression. One, as noted, is that as your level of fitness improves, you must increase the overload. The second is that these changes should be gradual. To improve your cardiovascular endurance, you must systematically train faster and/or longer. To improve your strength, you must increase the resistance your muscles must overcome. As your body adapts to the current overload, you must progressively increase that overload to continue to improve.

PRINCIPLE #6: BALANCE

To achieve total fitness, you must avoid concentrating on just one component. Sometimes people tend to concentrate on what they enjoy the most or do the best. Therefore, if you really enjoy running but don't enjoy strength training, you may tend to sacrifice the strength training and do more running. That's not bad, but you would be better off to do some training for all of the components of physical fitness, especially since all components are required for the job. Balance is also important when it comes to injury prevention. Training a muscle while ignoring its antagonist, e.g., working the biceps but not the triceps makes the weaker muscle more susceptible to injury.

PRINCIPLE #7: VARIETY

Variety ties in with balance, recovery, and specificity. Even the most die-hard fitness enthusiasts would get bored if they did the same exercises every day. Vary your routine to reduce the chance of boredom. For example, if you like to swim and have access to a pool, use both swimming and running to develop aerobic power and keep you excited about exercising. Find different places to train. Explore different weight training routines so that part of your program doesn't become stale.

PRINCIPLE #8: SPECIFICITY

Specificity in the fitness context means that you become proficient at what you practice. Running or other cardiovascular activities will not improve your muscular strength, and vice versa. It also means that you will show the greatest improvement in whatever activity you use for training. Running to improve your cardiovascular endurance won't improve your swimming or cycling as much as it will your running ability.

PRINCIPLE #9: ADAPTATION

The body adjusts to the effects of training, but does it in small increments. Over time, these small increments cause major changes in your body. For example, the increases in muscle mass from strength training don't happen overnight. But one day you will discover that you need a new uniform because the old one doesn't fit the same way anymore. Only by comparing periodic measurements can you truly appreciate the day-to-day adaptations that are occurring. Understanding that fitness is a long-term investment is important to avoid frustration and disappointment.

PRINCIPLE #10: INDIVIDUALITY

Each person will respond somewhat differently to the same training routine. These differences are due to several factors, including heredity, eating and sleeping habits, the environment, illnesses and injuries, level of fitness, and motivation.

The principle of individuality means that some of you are more likely to become more fit in a cardiovascular way than you are to become really strong. Some are more likely to be good runners, others good swimmers, and yet others better bikers. And each of you has a different individual potential for how good you can be.

PRINCIPLE #11: MODERATION

Too much of anything can be bad. For best results, you must be dedicated to your program, but temper that dedication with common sense and good judgment. Don't train when you are injured. Also, more is not necessarily better. Too much distance, speed, weight, or time can all lead to deterioration rather than development. Moderation in all things, not just physical training, is a good rule for life.

FITT Principles

To design a fitness program, you must consider all the exercise principles. Most importantly, you need to know how often, how hard, and how long to exercise and what activities will produce a training effect. To help you remember this information, use the acronym **FITT: Frequency, Intensity, Time, and Type of exercise which incorporates all the principles.** All of the information you need to develop a prescription for your fitness training can be summarized using the acronym FITT:

- F** — Frequency. How often to perform the type of exercise. Frequency incorporates the principles of regularity, recovery, and reversibility.
- I** — Intensity. How hard to exercise. Intensity incorporates the principles of overload and progression.
- T** — Time. How long the exercise session should be. Time also incorporates the principles of overload and progression.
- T** — Type. What types of activities train each component. Type incorporates the principles of balance, variety, and specificity.

Each fitness area and test has its own FITT guidelines.

HOW DO I DESIGN CARDIOVASCULAR TRAINING – the 1.5 mile run?

Cardiovascular endurance (CVE) training is necessary to improve on the 1.5 mile run to meet the goal of 15:48. The general FITT guidelines are:

FITT GUIDELINES FOR CVE TRAINING

Frequency =	3-5 days per week
Intensity =	60 to 85% of your maximum heart rate
Time =	20-30 minutes
Type of activity =	Walking, jogging, biking, swimming, aerobics

Cardiovascular training is exercise that stimulates changes in the oxygen transport system. For cardiovascular changes to occur, the body must be forced to perform a physical effort that requires large amounts of oxygen to be consumed. That is why cardiovascular activities are also called aerobic exercise, since aerobic means “with oxygen or air”.

Aerobic activities are exercises that, by forcing the body to use more oxygen, enable us to produce more energy. Oxygen comes into our body through the air we breathe, passing through our lungs and into the bloodstream. The heart pumps that oxygenated blood through the arteries to the working muscles where the oxygen combines with the stored sugars and fats (fuels) in the muscle to produce energy. The better trained our lungs are to intake oxygen, the better trained our heart is to pump the oxygenated blood and the better trained our muscles are to use the oxygen, then the more efficient the entire cardiovascular system is to provide energy and sustain endurance activity.

Your heart rate is a practical indicator of how much oxygen is being consumed. When our oxygen consumption increases, so does our heart rate. So, monitoring your heart rate can be a good method to determine if you are exercising intensely enough to improve cardiovascular endurance. The training method for accomplishing this is called Heart Rate training. The Heart Rate Training Plan can be used to design your program.

Fitness level – Based on your time for the 1.5 mile run, identify your CVE fitness level.

Frequency –For your fitness level, select a number of days for CVE training.

Intensity – Select an intensity for your fitness category.

Target heart rate - Calculate the target heart rate for the selected intensity.

There are five steps:

1. Determine your predicted maximum heart rate by subtracting your age from 220.
2. Subtract your resting heart rate from predicted maximum heart rate (from step 1).
3. Multiply results of step 2 by desired intensity range listed below.
4. Add resting heart rate back to the results of step 3. This is the target heart rate range.
5. To determine the ten second heart rate range, divide the upper and lower end of the target heart rate range by six.

Maintain your heart rate in that range while exercising.

Here’s an example. A 40 year old with a resting heart rate of 80bpm runs the 1.5 mile in 16 minutes. He decides to begin his training at 60-75% of his maximum heart rate reserve.

1. $220 - 40 = 180$

2. $180 - 80 = 100$

3. $100 \times .60 = 60$ $100 \times .75 = 75$

4. $80 + 60 = 140$ $80 + 75 = 155$

5. THR range = 140 – 155 and the ten second heart rate is 23-26 beats.

Time (duration) - Select the time (minutes) for your fitness level. This is the amount of time to exercise in the target heart rate range.

Type of activity – Select from one of the recommended activities for your fitness level.

HEART RATE TRAINING PLAN

Fitness level	Low CV fitness: Slower than 16:40	Moderate CV fitness: 14:41 – 16:40	High CV fitness: Faster than 14:40	
Frequency (days)	3	3-5	3 or more	_____
Intensity (%HR range)	60%	60-75%	75-85% THR	_____ _____
Time (minutes)	20	30-45	30 or more	_____
Type of Activity	Walking, jogging, swimming, cycling	Running, cycling swimming	Anything	_____

The best way to know if you are staying within your THR range is to use a heart rate monitor. If you don’t have a heart rate monitor, after you have been exercising for five minutes, stop and take your pulse rate for 10 seconds. Multiply that pulse rate by 6. If your pulse rate is within 5 beats above or below your target heart rate your effort (pace) is about right. If your pulse is too high, slow down or if it is too low, speed up your effort.

To specifically prepare for the 1.5 mile run the running program below should help you attain the goal.

CVE RUNNING TRAINING PROGRAM

<u>WEEK</u>	<u>ACTIVITY</u>	<u>DISTANCE</u>	<u>TIME</u>	<u>FREQUENCY</u>
1	Walk	1 mile	17-20 min.	5/week
2	Walk	1.5 mile	25-29 min.	5/week
3	Walk	2 miles	32-35 min.	5/week
4	Walk	2 miles	28-30 min.	5/week
5	Walk/jog	2 miles	27 min.	5/week
6	Walk/jog	2 miles	26 min.	5/week
7	Walk/jog	2 miles	25 min.	5/week
8	Walk/jog	2 miles	24 min.	5/week
9	Jog	2 miles	23 min.	4/week
10	Jog	2 miles	22 min.	4/week
11	Jog	2 miles	21 min.	4/week
12	Jog	2 miles	20 min.	3/week

HOW DO I DESIGN MUSCULAR STRENGTH AND ENDURANCE TRAINING – the push up, sit up and 1 RM bench press tests?

This training is required to attain the goals of 115 pounds for the 1RM bench press / .66 for the 1RM bench press ratio, 16 push ups and 35 sit ups.

Muscular strength and endurance (MSE) is the ability of a muscle or a group of muscles to generate and sustain force. Absolute strength is the maximal amount of force that a muscle can generate in one contraction. Dynamic strength is the ability of a muscle to make repeated contractions. Strength and endurance are developed by forcing the muscle to contract against a resistance.

The same general principles apply as with aerobic training only the overloading of the muscle is done by either increasing the resistance or the number of repetitions of a given exercise. There are several training modes for increasing strength depending upon the access to equipment. The first type MSE training is a calisthenic routine.

Calisthenic routine

The most effective MSE training is done with weight machines or free weights, because it is possible to vary the resistance (weight) for each exercise. Calisthenic exercises, which use the same resistance (body weight), are alternative means for beginners or those who do not have access to machines or free weights. They do not require equipment or much space to perform them. Here is the FITT formula for using calisthenic exercises:

FITT GUIDELINES FOR CALISTHENIC TRAINING

- **Frequency** = 3 or 4 times a week on alternate days.
 - **Intensity** = Body weight. You can increase the resistance by holding weights, wearing a weighted vest or having a partner resist your movement through the range of motion.
 - **Time** = 1 to 3 sets of 50% of repetitions that can be done for each exercise in 1 minute.
 - **Type** = Calisthenic exercises.
-

As noted, the time factor is defined in terms of repetitions and sets. A repetition is the number of times you do an exercise. For example, an individual completes 40 sit ups in one minute. They will start the sit up training by doing 20 repetitions per set. A set is the number of times they will do the 20 repetitions.

Calisthenic exercises, sometimes called free body exercises, have been used for centuries. Your body weight and gravity provide the resistance. Consequently the only variables are the numbers of sets and repetitions.

The following Calisthenics Training Plan applies these guidelines and can be used to design your program. Feel free to add exercises to this list to work all the major muscle groups.

CALISTHENIC EXERCISES

<u>Muscle group</u>	<u>Calisthenic exercise</u>	<u>Description</u>
Erector spinae (lower back)	Trunk lifts*	Lie on stomach, hands flat on floor, elbows bent. Raise trunk off floor keeping elbows on floor.
Pectorals/deltoids (shoulders and chest)	Push-ups	Toes on ground, hands on ground shoulder-width apart. Keep back straight. Lower upper body to ground and return to start.
Alternative if cannot do push up	Modified push up	Toes and knees on ground. Lower upper body to ground and return to start.
Latissimus dorsi (upper back)	Bent rowing	Use books or water containers as resistance. Bend forward at waist, alternately lower object in each hand until arms outstretched, then pull object back up to trunk.
Triceps (back upper arm)	Chair dips	Back to chair. Grasp sides of stable chair, feet straight in front. Lower body as far as possible and push back up.
Biceps (front upper arm)	Chin-ups	Hang from bar with arms straight, palms facing you. Pull up until chin above bar, return to hanging position.
Alternative if can not do pull up	Biceps curl	Using a book or water container in each hand while standing, keep elbows straight and alternately bring up object to 90 degrees and lower back down.
Abdominals (stomach)	Sit-up with arms crossed*	Start on back, knees bent 90°, arms crossed on chest. Raise up and have elbows touch knees with trunk at a 90 degree to the floor and return.
Quadriceps (front thigh)	½ knee bends	Feet shoulder-width apart, back straight, hands on hips, squat squat until thighs are parallel to ground, and return to start.
Hamstrings (back of thigh)	Leg curl	Lie face down, have partner apply resistance to back of leg as you curl it toward your buttock.
Gastrocnemius (leg calf)	Heel raise	Hands on hips, rise up on toes as high as possible. Increase range of motion by placing toes on 2-inch board.

*These exercises are contraindicated for those who have back problems.

In the calisthenic training program, perform each set as a circuit. In other words, do one set of each exercise in sequence, then start again with the first exercise and proceed through the sequence for the second set, then again for the third set. To develop a calisthenic training plan, using the Calisthenics Strength Training Plan, follow this sequence:

1. Select the exercises listed below or substitute ones that work the same muscle groups.
2. Determine the number of repetitions of each exercise you can do in 1 minute. This is your one minute max (1MM)
3. Follow the sequence on the form, starting with large muscle groups and moving to smaller ones. This sequence orders the exercises first for the upper body, then the lower body. Alternate pushing and pulling movements.
4. During week 1, perform one set of maximum repetitions for each exercise, i.e., the 1MM.
5. For week 2, divide the number of repetitions for each exercise by one half. This is your calisthenic exercise dosage (CED). Add a second set.
6. For weeks 3 and 4, add a third set of repetitions, again performing half of the repetitions done in the first week.
7. At the beginning of week 5, perform as many repetitions of each exercise as you can in one minute. This is your new 1MM. Calculate a new CED.
8. Maintain at 3 sets but recalculate your 1MM and CED every four weeks.

CALISTHENIC STRENGTH TRAINING PLAN

Exercises	1MM CED	Week 1	Week 2	Week 3	Week 4
		rep/ 1 set	rep/2 sets	rep/3 sets	rep/3 sets
Trunk lifts	_____	_____	_____	_____	_____
Push-ups	_____	_____	_____	_____	_____
Bent rowing	_____	_____	_____	_____	_____
Chair dips	_____	_____	_____	_____	_____
Pull ups	_____	_____	_____	_____	_____
Sit-ups	_____	_____	_____	_____	_____
½ knee bends	_____	_____	_____	_____	_____
Leg curls	_____	_____	_____	_____	_____
Heel raises	_____	_____	_____	_____	_____

This routine will not only provide total body muscular endurance conditioning, but will also improve your push up and sit up test scores.

Weight training routine

While the calisthenics routine will aid in developing muscle endurance it is not as efficient in developing absolute strength since the resistance cannot be varied as much. Weight training, whether with free weights or machines, is the most efficient method.

FITT GUIDELINES FOR MSE TRAINING

Frequency =	3 or 4 times a week on alternate days	
Intensity =	percentage of 1RM maximum weight	muscular endurance = 40-60% muscular strength= 80-95% both = 60-80%
Time =	sets and reps 1 to 3 sets	muscular endurance = 15-20 reps muscular strength = 2-6 reps both = 8-12 reps
Type =	weight machines, free weights, resistance bands, or partner resisted	

For a muscle to increase strength or endurance, you must place a higher workload on the muscle than is provided by your normal daily activity. The workload variables consist of the resistance, the number of sets, and the number of repetitions in each set of exercises.

A method often used for determining intensity is to work with percentages of the most weight you can lift in one all-out effort, called one-repetition maximum (1RM). This was the process you used to assess the 1RM bench press. As part of your weight-training program you could do this for all the exercises.

A safer method is to reverse-engineer your starting weight. For example, an individual decides to train for a combination of muscular strength and endurance. Using the 1RM approach, they would see how much weight they could lift for each exercise, and start training with 60-80% of that resistance. Or they could estimate the amount of resistance they could overcome for 8-12 correct repetitions. If they could perform more than 12 correct repetitions with a weight, they would add some resistance. On the other hand, they would lower the resistance if they found they couldn't do at least eight reps. This approach could take several iterations to find the correct starting weight. But if you start by underestimating the starting weight, you will greatly reduce the chance of injury. This trial and error approach will also enable you to become more familiar with the exercises if you are a beginner.

Continuing with this example, this officer would add resistance once they could perform 12 correct repetitions. Depending on the starting weight, you may add 5-25% as your strength improves.

The major weight training exercises are listed below.

WEIGHT TRAINING EXERCISES		
Muscle group	Free weight exercise	Machine exercise
Quadriceps/glutes	Half knee bends Squats	Leg extension Leg press
Hamstrings	Leg flexion	Leg curl

Gastrocnemius	Heel raises with Weight on back	Calf raises
Abdominals	Sit ups	Abdominal curl machine
Erector spinae	Trunk lift	Back extension machine
Pectorals	Bench press	Chest press
Latissimus dorsi	Bent rowing	Pull down
Deltoids	Military press	Seated shoulder press
Biceps	Arm curls	Arm curls
Triceps	Triceps extension	Triceps extension

Free weight exercises are described below:

FREE WEIGHT DESCRIPTIONS

Half Knee Bends (or Squats) With Weight on Back

You'll need a spotter for this exercise. Grasp a straight bar with an overhand grip, your hands slightly wider than shoulder-width apart, and place the bar on your shoulders at the base of your neck. Keep your torso and hips directly under the bar with your chest out, your shoulders back, and your head up. Your feet should be flat on the floor, slightly more than shoulder-width apart. The spotter should stand directly behind you, keeping her back flat and knees flexed. Throughout the rest of the exercise, the spotter's hands should stay close to the bar and follow it during the lift. Squat down to a count of two, inhaling as you descend. Avoid leaning forward, and keep your feet flat on the floor with your knees in line with your feet. Squat until the backs of your thighs are parallel with the floor. Begin the upward movement with your legs first, keeping your head up and chest out. Straighten your hips and knees, and exhale as you count to four.

Leg Flexion

You'll need a partner for this exercise. Lie face down with your legs extended. Flex one leg against your partner's resistance until your heel is as close to your buttocks as possible. Next, resist your partner's efforts as he returns your leg to the starting position. Repeat this exercise with the other leg.

Heel Raises

Stand on an elevated, stable surface such as a step that is approximately 6 inches high. Place your feet hip width apart with the balls of both feet near the front of the step so your heels are hanging over the edge. You may vary the position of your feet from pointing straight ahead to pointing slightly outward or inward. Keep your torso erect and your knees straight. Slowly raise your heels as high as possible. Pause for 2 seconds. Allow only your calves to do the work. Exhale as you ascend. While counting to four, lower your heels to a full stretch without pain. Do not move your torso or flex your knees. Inhale as you descend.

Sit up

Perform the sit up as for the callisthenic routine only hold a weight crossed across your chest to add resistance.

Bench Press

You'll need a spotter for this exercise. Use an overhand grip with your hands at least shoulder-width apart. Position your body so that you have four points of contact—your head, shoulders, and buttocks on

the bench and your feet on the floor. The spotter should position her feet 2 to 6 inches from the bench and use an alternate grip inside your hands. Signal the spotter to assist you in moving the bar off the supports. Push the bar to a straight-elbow position over your chest. The spotter should assist with moving the bar off the supports and should guide the bar to the straight-elbow position. Throughout the rest of the exercise, the spotter's hands should closely follow the bar's movement, ready to assist if necessary. Inhale as you slowly lower the bar to your chest. Keep your wrists straight and directly above your elbows. Exhale as you push the bar upward under control. Your elbows should extend evenly, and your wrists should be directly above your elbows. Pause at the straight-elbow position.

Bent Rowing

Use an overhand grip with your hands at least shoulder-width apart and your shoulders higher than your hips. Your lower back should be flat, your elbows straight, your head facing forward, and your knees slightly flexed. Slowly pull the bar straight up and pause momentarily before it touches your chest. Keep your torso rigid, and exhale as the bar nears your chest. Inhale as you slowly lower the bar straight down, taking care not to bounce or jerk the bar at the bottom. Do not allow the bar to touch the floor until the set is complete.

Trunk Lifts

Lie face down on a hyperextension bench with your knees level with your hips. The pads should be in contact with your hips and the backs of your ankles. Lower your torso to form a 90-degree angle at the hips. Place your hands on the sides of your head or cross them at your chest. To add resistance you can place a weight behind the head. Raise your trunk until your torso is parallel with the floor. Your head should face forward and your thighs and shoulders should form a straight line. Exhale throughout the upward movement. Inhale as you slowly lower your upper body to the starting position.

Military Press

Use an overhand grip with your hands at least shoulder-width apart. Keep your head upright and facing forward, and keep your elbows under the bar with your wrists extended. The bar should rest in your hands and on your chest. A spotter should stand directly behind you, as close as possible, with feet shoulder-width apart. Throughout the rest of the exercise, the spotter's hands should closely follow the bar. Push the bar straight up while keeping your back flat and erect. Exhale through the sticking point and pause at the top of the movement. Lower the bar slowly while inhaling. Do not bounce the bar off your upper chest.

Biceps Curls

Use an underhand grip with your hands shoulder-width apart. The bar should touch the front of your thighs. Your upper arms should be against your ribs, your elbows extended your torso erect, and your head facing forward. Keep your upper arms stationary and your elbows close to your body as you curl the bar to your shoulders. Be careful not to rock, jerk, or swing your body as you lift. Exhale as the bar nears your shoulders. Inhale during the downward movement, lowering the bar slowly to your thighs. Keep your elbows close to your sides and extend your arms completely.

Triceps Extension

Use an overhand grip with your hands 6 inches apart. Keep your torso erect, your head facing forward, your feet shoulder-width apart, and your fully extended elbows close to your ears. Inhale as you lower the bar behind your head to the top of your shoulders. Keep your elbows pointed up, and control the downward movement of the bar. Then push the bar until your elbows are again fully extended. Keep your elbows back and close to your ears. Exhale as the bar passes through the sticking point.

Use the Weight Training Chart to set up the program.

1. Determine the 1 repetition maximum (1RM) for each exercise. Use 1RM testing or the estimated procedure.
2. Determine if you are going to train for strength, endurance or a combination. Calculate 40%, 60% or 80% of the 1RM depending on your goal. This is your training weight (TW).
3. Perform the number of repetitions shown in the chart for each exercise.
4. Perform the routine 3 days a week.
5. Week 1 do 1 set for each body part.
6. Week 2 do 2 sets.
7. Week 3 do 3 sets.
8. After week 3, maintain 3 sets but add weight as you reach the upper limit of repetitions for your goal, i.e., 6 reps for strength, 20 reps for endurance, 12 reps for a combination of strength and endurance.

WEIGHT TRAINING CHART

MUSCLE GROUP	1RM TW	WEEK 1 REP/SETS	WEEK 2 REP/SETS	WEEK 3 REP/SETS	WEEK 4 REP/SETS
Quads/Glutes	_____	_____	_____	_____	_____
Hamstrings	_____	_____	_____	_____	_____
Gastroc	_____	_____	_____	_____	_____
Abdominals	_____	_____	_____	_____	_____
Erector spinae	_____	_____	_____	_____	_____
Pecs	_____	_____	_____	_____	_____
Lats	_____	_____	_____	_____	_____
Delts	_____	_____	_____	_____	_____
Biceps	_____	_____	_____	_____	_____
Triceps	_____	_____	_____	_____	_____

There are a number of additional tips that will make your training safer and more effective.

1. Warm up with calisthenics and stretching for 3 to 5 minutes before doing a resistance workout.
2. Start with the largest muscle groups and work down to the smallest. This sequence orders the exercises first for the upper body, then the lower body.
3. Exercise the muscles through the full range of motion (FROM).
4. Control the weight, and avoid fast and jerky movements.

5. Exercise a muscle to momentary failure. A muscle consists of thousands of individual fibers. For each bout of work, only as many fibers as are required to accomplish the work are “recruited” for the job. To ensure maximum participation of the fibers, it is necessary to work the muscle to exhaustion.
6. Rest between each set of exercises: for endurance, 1.5 to 2 minutes; for strength, 3 to 5 minutes; for both, 30 to 60 seconds.
7. Practice proper form. For most people it is more comfortable to exhale while lifting the weight and inhale while lowering the weight. Do not hold your breath or hyperventilate.
8. If training with free weights, keep the weights close to the body.
9. Whenever possible, work with a partner. There are three advantages to this. One is that you are more likely to push yourself when someone is there with you. Another is that you can more easily accomplish negative work. Finally, it is safer to work with a partner.

HOW DO I DESIGN ANAEROBIC TRAINING - the 300 meter run, agility run and vertical jump tests?

Anaerobic activities are those that are done in the absence of oxygen. That is, they use energy sources that are already present in the muscle. This source of energy is limited, and so anaerobic activities are of relatively short duration. For example, sprinting, jumping, dodging, pushing or pulling an object short distances are examples of anaerobic activities. The 300 meter run, agility run and vertical jump are the fitness tests that measure these three anaerobic areas: speed sprinting, agility speed movements and explosive leg power. So while all three of these activities are anaerobic in nature, we have divided anaerobic training into three sub sections:

Anaerobic running
 Lower body explosive power
 Agility running

The general FITT guidelines are shown below:

FITT GUIDELINES FOR ANAEROBIC TRAINING	
Frequency =	Once a week
Intensity =	Anaerobic and agility running - speed of the activity Lower body explosive power – height of hops, jumps, bounds
Time =	Anaerobic and agility running - length of each exercise bout Lower body explosive power – number of repetitions
Type =	Sprinting, plyometric jumping and bounding, dodging

Anaerobic sprinting

To improve the overall anaerobic system, your training activities must be done at a faster pace than you would normally use for the activity. For example, for running, your anaerobic training would be short sprints done at a faster speed than your long runs. The sprinting program will directly affect your time on the 300 meter run assessment test.

There are five variables to consider in this part of the plan:

1. Distance
2. Speed
3. Repetitions

4. Rest between each repetition
5. Frequency

If you have access to a running track, you can use it to run known distances such as a quarter, half and full lap. Or you might run the length of a football field, a city block, or any distance that you can use repeatedly. It isn't a requirement to cover known distances, but it does make charting your progress easier. Instead of a known distance you can also run for a certain period of time. For example, you might decide to see how far you can go during a 30 second run.

To develop your Anaerobic Sprint Training plan, refer to the chart below.

The **first step** is to time an all out effort for a given distance. You will first start with 60 meters. We'll call the distance your training initial training distance (**ITD**) and the time your initial time or **IT**.

The **second step** is to multiply the **IT** by 1.25 to get your starting training time. When you double the length of the ITD in week 7, calculate the IT for the new distance. Follow the schedule below:

ANAEROBIC SPRINT TRAINING					
<u>Week</u>	<u>Distance</u>	<u>Repetitions</u>	<u>Time</u>	<u>Training Time</u>	<u>Rest Frequency</u>
1	60 meters	10	TBD*	1 min.	1/week
2	60 meters	12	TBD	1 min.	1/week
3	100 meters	12	TBD	2 min.	1/week
4	100 meters	12	TBD	1.5 min.	1/week
5	100 meters	15	TBD	2 min.	1/week
6	200 meters	8	TBD	2 min.	1/week
7	200 meters	10	TBD	2 min.	1/week
8	200 meters	12	TBD	2 min.	1/week

* TBD = To Be Determined. This is the initial time (IT) to do the distance multiplied by 1.25

IT = _____ IT multiplied by 1.25 = _____

Explosive power training

This will be a very different type of training for most of you. Those who have participated in organized sports, particularly at the collegiate level, may have done "plyometric" training for your sport. Plyometric training involves jumping, bounding, skipping, hopping and lunging. Because this training puts extra stress on the lower extremities, we recommend that you build a base of lower body muscular strength and anaerobic running before starting your lower body explosive power program. We suggest a minimum of six weeks of training for each of those components of fitness. Plyometric training will directly impact your vertical jump score of that fitness assessment test. Use the Polymeric training form to plan your training.

1. If you are new to this type of training, start with ankle hops.
2. Add one new exercise per week
3. Perform each exercise with 1 set of 10 repetitions, 3 days a week
4. Do the repetitions ballistically without stopping.

5. Rest 3 minutes between each set of each exercise.
6. Week 1 do ankle hops.
7. Week 2 do single leg hops and add prancing.
8. Week 3 do double leg hops, skipping, and jump rope.
9. Continue with at least three exercises per training session.

PLYOMETRIC TRAINING

<u>Exercise</u>	<u>Sets</u>	<u>Reps</u>	<u>Rest</u>	<u>Frequency</u>
	1	10	3 min.	3 times/week
Ankle hops	—	—	—	—
Single leg hop	—	—	—	—
Double leg hop	—	—	—	—
Jump rope	—	—	—	—
Prancing	—	—	—	—
Skipping	—	—	—	—
Jumps	—	—	—	—
In depth jump	—	—	—	—

Agility training

The training principles for the development of agility are similar to the principles of training for anaerobic sprinting. Ideally, you would perform a specific agility routine at least one day each week. However, with limited time available for performing all the other exercise routines (strength, cardiovascular, anaerobic sprinting, stretching) it may make more sense, from a time management perspective, to incorporate the agility training with the other programs. There are five different training strategies that can be applied.

1. Practicing the components of agility run test. Use the Agility Training form.
 - a. The first step is to time yourself for an all out effort with 4 obstacles (chairs, traffic cones, or anything to serpentine around) in a line 10 feet apart for a total of 30 feet.
 - b. Sprint 30 feet
 - c. Turn and serpentine around obstacles for 30 feet
 - d. Turn and serpentine back through obstacles
 - e. Turn and sprint back to starting line

This is called initial time or IT.

The second step is to multiply the IT by 1.25 to get a training time. Then follow the schedule on the next page: The total training distance is 120 feet (four 30 foot sprints/serpentines).

AGILITY TRAINING

<u>Week</u>	<u>Training Distance</u>	<u>Repetitions</u>	<u>Training Time</u>	<u>Rest Time</u>	<u>Frequency</u>
1,2	120 feet	4	1.25 of IT	1 min.	1/week
3,4	120 feet	5	1.25 of IT minus 1-2 sec.	1 min.	1/week
5,6	120 feet	6	1.25 of IT minus 4-5 sec.	1 min.	1/week

7,8	120 feet	4	1.25 of IT minus 5-6 sec.	1 min.	1/week
9,10	120 feet	4	1.25 of IT minus 6-7 sec	1 min.	2/week
Successive weeks	120 feet	4	1.25 of IT minus 7-8 sec.	1 min.	2/week

IT = _____ IT multiplied by 1.25 = _____

2. Adding an agility component to your cardiovascular routine. With this approach you would do some agility drills about half way through your CVE run. For example, you could set up 10 obstacles such as chairs, traffic cones, or anything to serpentine around about 10 feet apart in a line. As you approach the obstacles you would sprint as fast as possible around them, then jog back to the first obstacle and repeat the serpentine running another two or three times. Then use the remainder of your CVE run as a cool down.
3. Adding an agility component to your anaerobic sprinting routine. This would be identical to adding it to the cardiovascular routine except that you would be doing it after the last sequence of sprints.
4. Incorporating change of direction movement to cardiovascular or anaerobic running routines.
2. Rather than setting up a set course of obstacles, perform 10 quick changes of direction while doing the sprint or jogging work. Turn left and sprint toward the side of the track, then quickly turn right toward the right side and repeat 10 times. This could be done once during each lap or several times during the last lap of sprinting or jogging.
5. Creating an agility/anaerobic circuit. During circuit training you move from one exercise to another with a set rest period or activity, such as running, between exercises. The same principles can be applied to anaerobic training where you vary sprints, plyometrics and agility drills into one routine. In this routine you could identify selected points where you would do the 10 change of direction movements described in # 4 and three stations where you would perform plyometrics. This way you could get agility and explosive leg strength work in one routine. An example is below:
 - Sprint 20 yards then do 10 change of direction sprints
 - Sprint 20 yards then do 20 repetitions of a plyometric hop
 - Walk 30 yards then do 10 change of direction sprints
 - Sprint 20 yards then do 20 repetitions of a plyometric jump
 - Walk 30 yards then do 10 change of direction sprints
 - Sprint 20 yards then do 20 repetitions of a plyometric bound
 - Walk 30 yards then do 10 change of direction sprints
 - Sprint 20 yards then do 20 repetitions of a plyometric jump
 - Walk 30 yards then do 10 change of direction sprints

HOW DO I PUT THE ROUTINES TOGETHER?

You now have a specific routine for each fitness area. The next step is to put them together into a balanced plan. There are several key factors to consider.

Scheduling

You will not follow an exercise program unless it is convenient. There is no “cookbook” solution for scheduling your fitness training. The most important factor in making this decision is what works best for you.

You could combine your aerobic, strength and flexibility routines into a single training session lasting approximately 45 minutes and train just three days a week. Some experts contend that you should do your aerobic training before the MSE training. We believe you should do whichever you like the best last. For example, if you enjoy running more than lifting weights, you are more likely to complete the entire workout if you lift first.

Some prefer doing their cardiovascular endurance and MSE training on separate days. This approach requires six days of exercise per training week. You should be doing some stretching before and after each of those workouts.

From a physiological perspective the timing of exercise doesn't really matter. Your choice of morning, noon or evening exercise may depend on one or more of several factors, e.g., family considerations, work schedule, convenience, stress management, and facility availability. Finally, the schedule of activities may have to be made around job or family considerations. Which ever schedule you choose must be convenient for you to maximize your chances of adherence.

Safety

Your safety and the safety of others depends on your awareness of several factors. These are important to minimize the risk of injury, undue fatigue and medical emergencies:

Warm up/cool down. It is always important to gradually prepare your body for strenuous exercise. You should warm up for about five minutes or until your heart rate has been elevated before doing the core exercise routine. You can do fast paced walking or jogging. Swinging the arms, taking deep breathes and doing the stretching exercise both statically and ballistically is also important. Cooling down after exercise is just as important to prevent soreness and cramping. Basically it is identical to the warm up activities only at a slower pace and effort.

Monitoring yourself. Periodically monitor your effort by taking your heart rate. A simple test is the “talk test”. If you cannot carry on a conversation the exercise is probably too hard. You also should be aware of certain warning signs while exercising to include: chest pain, dizziness, pain or numbness in part of the body, or blurred vision. If you experience these you should stop exercising and consult a physician.

The timing of exercise. You should wait at least one hour after eating before exercising.

Exercise clothing and apparel. Wear loose fitting and comfortable clothing. A good pair of shoes is important if walking, running or playing sports. They should have good heel cup support and solid soles.

Environmental Guidelines

The type of environmental conditions that you train in can have a significant impact on exercise safety and performance. We adapt to training within a specific environment under specific conditions. An adjustment or acclimatization period is required, normally 30 days, if our training environment changes. The more fit we are, the quicker the acclimatization. There are four conditions to be aware of.

Heat and Humidity: The combination of both can cause serious medical problems and even death. Heat exhaustion followed by heat stroke is a serious medical emergency. A heat index combining temperature and humidity is used to express heat stress situations. When the heat stress is in the moderate or high categories, it is best not to exercise except early in the day or in an air conditioned environment. Drink plenty of water, wear loose clothing and lower your intensity when it is extremely hot and humid.

Cold: Cold weather can also cause serious medical problems that could lead to death. It places a burden on the body for temperature regulation and circulation. Cold stress can cause frostbite to peripheral body parts, or to the central core, causing life-threatening hypothermia. Be aware of the wind chill factor. The combination of wind and cool temperature increases the cold stress. Wear clothing in layers and drink plenty of water even if it is cold. Wear protective gear for the head, ears and hands.

Altitude: We have to work harder to maintain a given level of activity at higher elevations because there is less oxygen in the air. Altitude starts to have a major impact on the body at 5,000 feet. The body adapts to a higher altitude by developing more red blood cells so more of the limited oxygen can be distributed. Decrease workout intensity until you become acclimatized. Altitude sickness causes the blood pressure to rise, resulting in nausea and weakness. It occurs when someone is physically active at an altitude he or she hasn't adapted to yet. Apply the same precautions as noted for exercise in cold weather.

Pollution: Pollution poses a similar problem to that of altitude in that there is not enough oxygen in the air. However, the cause is different because the pollutants push out the oxygen. This lack of oxygen makes exercise more demanding. Breathing the pollutants is harmful as well. It makes exercising uncomfortable because of eye, nose, and lung irritation and like altitude it makes any effort more difficult. The problem is that we can not eventually adapt or acclimatize to pollution. To minimize the pollution effect exercise early in the day when traffic is low or exercise in a controlled environment such as a gym or mall.