Marines

United States Marine Corps
Physical Fitness, Combat Fitness and Marine Corps Water Survival Training Program

“ Let no man’s ghost ever say, had your training program only done its job” -The Drill Instructor's Motto

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Preface

This Guide has been prepared to assist both Security Assistance Officers (SAOs) and International Military Students (IMSs) so that international students who attend our courses are equipped to meet all physical prerequisites of the course. It not only provides a concept for developing and maintaining physical fitness standards required of all Marines and international students who attend training with the Marine Corps.

A good physical fitness program can improve combat readiness; it reduces injuries, improves training, enhances productivity and mental alertness and awareness, and promotes team cohesion as well as combat survivability and effectiveness. This Guide includes ways physical fitness can be developed and maintained, physical fitness test requirements, as well as information on injury prevention and proper rehabilitation. It also introduces foot marches and other physical training events such as dry land skiing exercises routinely used to establish a unit physical fitness training program.

The Appendices of this Guide provide information on the courses that have a physical requirement, exercise programs commonly used in the Marine Corps, combat water survival standards and swim qualifications, how to lead a unit PT program, and a guide to nutrition.

Users of this publication are encouraged to recommend changes and submit comments for improvement. Each comment should be keyed to the specific page, paragraph, and line of the text in which a change is recommended. A reason should be provided for each comment to ensure understanding and complete evaluation. As you use this Guide, if you don't find what you are looking for – **ask!** We at the Marine Corps Security Cooperation Group, Security Assistance Branch stand ready to help clear your obstacles quickly and efficiently.

Medical Officer's Note

The programs in this Guide are optimally designed for a progressive training period. If you have not been exercising and have only four weeks until your school starts, do not expect to cram this into four weeks. You need to start gradually. If you start to feel pain in your lower legs or feet, back off for a while and start back slowly. Seek medical care if necessary.

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Chapter 1
Overview of Marine Corps Physical Training (PT)

"As important as having strength is being known to have it."
- McGeorge Bundy: In Foreign Affairs, 1964

Marines are required to be "...physically fit, regardless of age, grade or duty assignment." and are required to participate in a minimum of three hours of physical fitness training per week. Those who are not physically fit are a detriment to the readiness and combat efficiency of their unit and detract from the overall performance of their Service.

Even though physical training is a part of Marine training, not all courses include physical training as part of the course curriculum or have a physical fitness prerequisite. International Military Students (IMS) are encouraged to participate with fellow students in the PFT or physical training that is not considered a part of the curriculum, but a part of the training schedule.

For those courses where physical training is a part of the curriculum, physical training will be demanding. Accordingly, specific physical fitness standards and/or combat swim qualifications have been established at these formal Marine Corps courses. The standards are noted in the prerequisite section of the course description section of the *Marine Corps Security Cooperation Group, Security Cooperation Office Desktop Guide* and reflect the particular training requirements of the course involved. All students attending Marine Corps schools are expected to at least meet the minimum requirements in this important area.

When students report to training at most of our Marine Corps schools, their first physically evaluated event is the initial Physical Fitness Test (PFT), initial Combat Fitness Test (CFT) and possibly a Marine Corps Water Survival Training test. Chapter 4 contains the Marine Corps Water Survival Training Program qualification and testing procedures. The PFT consists of pull-ups, abdominal crunches, and a 3-mile run. The CFT consist of Movement to Contact, Ammo Can Lift and Maneuver Under Fire. Instructions for the conduct of the PFT and CFT are in Chapter 6 of this Guide.

Appendix A contains a listing of courses that are physically demanding, with the minimum physical fitness requirements or swim qualification requirement. This list will change, so please be sure to check the current *Marine Corps Security Cooperation Group, Security Cooperation Office Desktop Guide*. Even though this chart reflects the minimum requirement, those students who can achieve a higher score will be more likely to succeed than those who score closer to the minimum. The balance between strength and endurance can be achieved if a student can perform each event resulting in a PFT score of 225 or higher and a CFT score of 270 or higher. Exceptional performance in one category can offset poor performance in another category but only to a certain extent. A student that can do 20 pull-ups but cannot complete a 3-mile run in less than 30 minutes does not really have the balance that is necessary for success.

It is important that all IMSs have a complete medical screening prior to departing their home country. If it is discovered that an IMS cannot qualify for or complete training by reason of physical condition then the IMS will be returned to their home country as soon as the condition permits.

Marines participating in the PFT or physical training as part of unit training or part of the curriculum normally will wear "uniform" PT gear. **Students should have in their possession one USMC 009 olive drab sweatshirt, one pair of olive drab sweatpants (Winter wear) or shorts and T-shirt (Summer wear).** Marines participating in the CFT will wear boots and utility trousers with a olive drab T-shirt. IMSs attending courses where physical training is a part of the training should be prepared to defray cost to purchase appropriate PT gear.

IMSs should begin physical fitness training prior to reporting for Marine Corps training and should work to maintain their physical proficiency throughout their training.

Basic Officers Course, Winter PT

The physical training programs in this Guide have been designed to teach, then test and evaluate, a very high level of physical fitness in a minimum amount of time. It is built on the principles, which will test physical courage, will-power and determination, while preparing you for the rigors of future Marine Corps training. These physical aspects are designed to test an individual's general strength and endurance under varying field and tactical conditions. You will find these aspects challenging and demanding. The instructions for different exercises in Appendix B will help you.

- High Intensity Tactical Training (HITT): HITT Program is a comprehensive series of warm-up, conditioning, and cool-down exercises.
- Run Circuit: A circular course consisting of many exercise stations designed to build endurance and overall body strength.
- Fartlek Course: A 3 to 4 mile trail, consisting of nearly one dozen exercise stations, designed to build endurance.

- Obstacle Course: A 100 meter long series of obstacles that must be negotiated in a prescribed amount of time.
- Conditioning Hikes: These range from 3 to 15 miles with combat gear.
- Combat Course: This is a 1.5 mile course which simulates a combat environment by stressing all around security and noise discipline while negotiating a series of obstacles.
- Endurance Course: A 3.5 mile course that tests physical endurance & ability to cross and negotiate various obstacles

How to Physically Prepare for Marine Corps training

Students who work hard in preparing themselves physically and mentally will find that they are able to concentrate their efforts on learning and practicing new skills. Using this preparation guide and the preparation program on the following pages, as well as seeking assistance from the Security Assistance Officer, will get you started in the right direction. The more time and effort that you put into preparing, the greater the likelihood of success. Physical fitness has a great influence on total performance. Acceptable performance will increase an individual's self-confidence and thereby positively affect leadership performance. Remember, your desire and attitude will be a big factor in determining your success.

Safety Points For Your Physical Training Program

Pull-Ups,
Officer Candidate School

1. Always warm-up, and relate the warm-up to the activity.
2. Start at an easy pace and gradually build up.
3. Drink plenty of water before, during, and after.
4. Eat three balanced meals a day, with an emphasis on breakfast.
5. Wear quality running shoes and socks to prevent injuries that often occur with a sudden increase in exercise. Your cool down should include stretching.
6. Always cool down. This will assist in the prevention of injuries.
7. Seek medical help if you have an injury, so as not to prolong and aggravate the condition.

Chapter 2
Physical Training and Conditioning

"Daily practice of the military exercise is much more efficacious in preserving the health of an army than all the art of medicine."

- Vegetius: De Re Militari, 378

Characteristics of physical training:

- Physical Fitness. To Marines, the term physical fitness means a healthy body and the endurance to withstand the stresses of prolonged activity and adverse environment. It includes the capacity to endure the discomforts that accompany fatigue and the ability to maintain combat effectiveness.
- Stamina. A combination of muscular and cardiovascular endurance, stamina is the most important aspect of fitness for Marines. Cardiovascular fitness should be the basis for all physical training because of its contribution to overall health and long life. Muscular endurance is closely associated with cardiovascular endurance. It is the physical characteristic that will allow prolonged activity of a moderate tempo. For Marines, this represents the ability to march long distances with heavy loads, or to work long hours and still maintain the reserve to carry on in an emergency.
- Strength. This is the ability to manipulate weight or, for a Marine, his/her own body weight and possibly that of another Marine. A certain amount of strength is also necessary for appearance, confidence, and load-carrying ability. It is essential that a Marine is able to handle his/her own body weight; if he/she cannot, he/she is either too heavy or too weak.

Objectives of the Marine Corps Physical Conditioning Program. The objectives of the Physical Conditioning Program are:

- To develop in Marines a reserve level of physical fitness that will enhance their chance of winning in a combat situation.
- To develop Marines who are physically capable of performing their duties in garrison and in combat.
- To provide a medium for developing the self-confidence of the individual Marine and thereby enhance overall discipline, morale, esprit-de-corps, unit efficiency and the desire to excel within the Marine Corps.
- To contribute to the health and well-being of every Marine through regular exercise and health education.

Principles of Physical Training. Individuals should focus on training factors such as **F**requency (repetition of the activity), **I**ntensity of the exercise, duration (**T**ime) of workouts, and **T**ype of training (the FITT Principle). Proper physical conditioning is based on several

principles, with the most important principles being *specificity, overload, progression, individual differences, and detraining.*

Specificity of exercise principle. The principle of specificity states that the body will adapt to a certain activity (i.e., cardiovascular, strength, or endurance training) depending on the type of overload (stress). The more similar the training exercise is to the activity (movement), the more likely the individual is to improve in that activity.

Overload principle. This principle states that by physically training at levels above normal, an individual can bring about physical improvement and a training change. This principle can be applied by changing the training frequency, intensity, mode and duration.

Progression principle. Gradual progression from a low intensity state of conditioning to a higher state is possible through a progressive physical training program. Individuals should balance the frequency, intensity and duration of physical training with the risk of injury. However, too little stress results in little to no improvement.

Individual differences principle. An individual's relative conditioning level at the start of training is important. An individual can optimize training benefits from conditioning programs that are developed to meet his or her needs. Unit PT should enhance, not be basis for, your physical performance.

Detraining (reversibility) principle. Detraining occurs rapidly when an individual stops exercising. Significant reductions can be measured after only one or two weeks of detraining. To maintain a level of conditioning the training frequency is one session per week. The loss from not training is twice as fast as the gain.

Overtraining. When physical training is conducted too frequently and too intensely, overtraining invariably results, leading to an increased risk of injury and a decrease in performance. Constant, severe training regiments do not provide adequate recovery.

Rest and recovery. Rest refers to the time interval between repetitions or training sessions. Active rest is time off from training but not from daily activity. This allows the muscles to work and the nerves to rest. Recovery is an actual planned event in the training schedule. It can occur when a hard training day is followed by an easy training day.

Warm-up and cool-down. The warm-up and cool-down are also critical components of hastening recovery. These activities are a transition between inactivity and the physical training event to be performed.

Intensity. The optimal range for exercise improvement is between 65 percent - 85 percent intensity. Greater than 85 percent intensity increases the risk of musculoskeletal injury.

Factors That Affect Physical Training. The major factors that relate to training improvement are the initial fitness level, frequency and intensity of exercise, time (duration), type, and progression of exercise (FITT Principle).

Frequency. Individuals can achieve results in as little as three nonconsecutive days per week. Optimally, training frequencies should be between three and five days per week.

Intensity. The intensity of aerobic exercise can be checked by monitoring one's heart rate. Intensity of resistance training can be modified by changing the resistance, repetitions, and sets of an exercise, the number of exercises per muscle group, or decreasing the amount of rest between sets.

Obstacle Course
Basic Officers Course

Time (Duration). The time required to effect physical improvement depends on the total work done, training intensity, training frequency and initial fitness level. Twenty to thirty minutes are optimal for aerobic training with an intensity at 70 percent maximum heart rate. With high-intensity, anaerobic interval training, significant improvements occur with 10 to 15 minute exercise periods per workout. Conversely, if one trains at a low-intensity level, he or she may need to train for at least 45 minutes to achieve improvements.

Type (Mode). Training effects are specific to the type of training performed (specificity).

Maintenance. If an individual maintains training intensity, he or she can remain at the same fitness level with less frequency and duration of physical activity.

Effects of Climatic Conditions. Temperature, both atmospheric and body, affects the physical performance of Marines. Proper maintenance of body temperature through warm up exercise, proper dress in cold weather, and removal or adjustment of clothing in hot weather is necessary for effective performance and health. Climatic factors to be considered are the following:

Exercise In High Temperatures and High Humidity. Marines can endure strenuous physical activity in extremely hot temperatures if they are given an opportunity to become acclimated and if they take enough salt and water. It is essential to continue physical training programs in hot climates. Marines can better withstand high temperatures when they are well-conditioned. High humidity combined with high temperatures presents a serious danger. These conditions prevent the natural cooling of the body by the evaporation of perspiration. Training schedules should conform to the provisions of the base commander in respect to wet bulb conditions. Those who conduct training under these conditions should monitor weight loss and be careful to make fluid replacement adjustments.

Exercise at High Altitudes. Certain problems are encountered in conditioning Marines stationed in high altitudes because the heart undergoes greater exertion during exercise. It is particularly important that only light exercise be given initially at such altitudes. A Marine's body gradually adjusts to high altitudes within a few weeks. After this adjustment, progressively greater amounts of exercise are possible.

Exercise in Arctic Regions. Military duty in the arctic is so arduous that a high level of

physical conditioning is essential. Because of the difficulties of carrying on physical conditioning exercises in extreme cold, Marines should be conditioned to the highest level possible before they arrive. A sustaining program will then maintain that level. When exercising in cold weather, Marines should be required to remove excess clothing to prevent them from becoming damp with perspiration.

Warm-Up and Flexibility Training. It is fundamental that you warm up gradually before conducting strenuous activities. A proper warm-up increases heart rate which prepares the body for a training overload, and helps reduce the risk of injury to muscles and ligaments. A warm-up is both general and specific to an activity. Flexibility should be an integral part of any warm-up or cool-down. A total warm-up program includes a general warm-up period followed by an activity specific warm-up.

Warm-up. A general warm-up period consists of 5 to 10 minutes of low-intensity aerobic exercise such as walking, slow jogging, etc. A general warm-up increases heart rate, blood flow, deep-muscle temperature, respiration rate, lubrication of joints, and perspiration. A warm muscle exhibits a greater amount of flexibility. Additionally, a specific warm-up uses movements that are similar to the movements of the activity. The more power necessary for the activity, the more important the warm-up.

Flexibility. Flexibility is the range of possible movement in a joint and its surrounding muscles. Stretching is the type of activity that increases flexibility. There is some evidence that stretching may aid in the prevention of injuries. Stretching after a warm-up and before activities should normally be 8 to 12 minutes.

FITT Principle for flexibility training. The goal of flexibility training is pain free joint range of motion.

Type:	Static Stretching.
Frequency:	3 - 5 days/week. Stretching can be performed daily.
Time:	Hold stretches for 20 seconds.
Intensity:	Easy stretch - Move into the stretch until you feel a mild tension, and relax. Hold stretches that feel good.
Progression:	Developmental stretch - with improved flexibility, carefully increase the tension.

Guidelines for stretching

- Warm-up prior to stretching.
- Stretch slowly with control.
- Use proper form.
- Relax with rhythmic breathing.
- Hold only tension that feels good.
- No bouncing.

Stretching adaptations. Proper stretching has many benefits, listed below.

- Reduces muscle tension and makes the body feel more relaxed.
- Aids coordination and motor skills by allowing for freer, easier movement.
- Increases joint range of motion.
- Allows a muscle to resists stress better than an unstretched muscle.
- Promotes circulation.
- Reduces stiffness and soreness following intense physical training.

Muscular Strength and Endurance Training. At the core of effective resistance training is safe and proper execution of exercises. Proper lifting techniques reduce stress in the lower back and help prevent back injuries.

Muscle actions. There are three major types of muscle actions in resistance training: isometric, concentric, and eccentric actions. *Isometric* muscle actions occur when a Marine pushes or pulls on an immovable object. *Concentric* muscle actions occur when force is applied while a muscle shortens and a joint moves. *Eccentric* muscle actions occur when force is produced while a muscle is lengthening, as when a Marine lowers an object.

Proper lifting technique. Proper lifting technique includes keeping a stable base of support, maintaining proper curvature of the spine, keeping the load close to the body, and breathing properly. A stable base of support enables an individual to maintain proper body alignment during lifting, placing appropriate stress on muscles and joints. One should NOT hold his or her breath throughout the lift; failure to exhale when lifting decreases blood to the brain and heart which may cause fainting or increase the risk of injury.

FITT Principle for strength training. Strength training goals can include improving muscle tone, increasing strength and power, and body building. The FITT principle for strength training uses the 2-for-2 rule to make load adjustments. When an individual can perform 2 (or more) repetitions beyond the number listed in the last set for 2 consecutive workouts, increase the weight.

Type:	Resistance Training for Muscle Tone.
Frequency:	2 - 3 nonconsecutive days/week.
Sets X Repetitions:	2 - 3 sets X 12 - 20 repetitions.
+Intensity:	The last repetition of each set should be difficult to complete.
	Rest 20 - 30 seconds between sets.
Progression:	Add repetitions to 20 repetitions.
	Add sets to 3 sets.
	Add resistance following the 2-2 rule. *
Type:	Resistance Training for Muscle Strength.
Frequency:	4 - 6 days/week.
Sets X Repetitions:	3 - 5 + sets X 1 - 8 repetitions.
Intensity:	The last repetition of each set should be difficult to complete.
	Rest 2 - 5 minutes between sets.
Progression:	Add repetitions to 8 repetitions.
	Add sets to 5 + sets.
	Add resistance following the 2-2 rule. *
Type:	Resistance Training for Muscle Bulk.
Frequency:	4 - 6 days/week.
Sets X Repetitions:	3 - 6 sets X 8 - 12 repetitions.
Intensity:	The last repetition of each set should be difficult to complete.
	Rest 30 - 90 seconds between sets.
Progression:	Add repetitions to 12 repetitions.
	Add sets to 6 sets.
	Add resistance following the 2-2 rule.*

Program design considerations

- Establish goals for resistance training.
- Exercise selection to develop all the major muscle groups.
- Determine training frequency.
- Exercise order: Multiple-joint exercises to isolated-joint exercises. Multiple joint exercises include working the larger muscle groups of the back, chest, and legs, which require the use or movement of more than one joint.
- Do not exercise the same muscle groups on consecutive days, allow for at least a 48-hour rest period.

Interval training. Interval training uses intervals that can consist of running, swimming, calisthenics, or resistance training. Work intervals of less than 30 seconds are typically done with rest intervals of approximately 3 times the exercise duration. Marines should recover fully between exercise intervals. Guidelines for Interval Training:

	Interval Sprint Training	**Interval Middle-Distance Training**	**Interval Distance Training**
Primary Energy System	Immediate	Short-Term	Long-Term
Duration of Work (seconds)	10 sec - 30 sec	30 sec - 2 minutes	2 - 5 minutes
Duration of Recovery (seconds)	30 sec - 90 sec	60 sec - 4 minutes	2 - 5 + minutes
Work : Recovery	1:3	1:2	1:1
Repetitions	25 - 30	10 – 20	3 - 5

Baechle TR, Essentials of Strength Training and Conditioning, Human Kinetics, 1994: p. 411.

Intensity. The intensity of the exercise (work) interval and length of the active rest (recovery) intervals can be determined by monitoring the heart rate. The optimal training range is between 65 percent and 85 percent of the maximum heart rate. Exercise intensity should be increased or decreased if the heart rate is less than or greater than 85 percent heart rate maximum, respectively. The heart rate should return to 65 percent heart rate maximum during the recovery interval.

Determining training heart rate. The method for estimating training heart rate (train HR) involves first finding an individual's maximum, age-related heart rate (HR max):

220 minus (your age) = HR max
65 percent HR max = .65 (220 minus age)
85 percent HR max = .85 (220 minus age)

Aerobic Endurance Training. An individual trains the cardiovascular system with aerobic endurance training. "Aerobic" means that oxygen is used to release energy. Examples of aerobic exercise are such large-muscle group activities as walking, conditioning marches, running, nonsprint cycling, swimming, etc. In optimal aerobic training, there is sufficient cardiovascular overload which should occur by the appropriate, specific muscle groups. Simply stated, runners should run, swimmers should swim, and cyclists should cycle to improve that activity.

Methods of aerobic training. Both interval training and continuous training enhance aerobic capacity as long as the intensity is sufficient to overload the aerobic system. Interval, continuous, and fartlek training are three common methods to improve aerobic fitness.

Interval aerobic training. Interval training uses intervals of work and rest. More work can then be accomplished than could normally be completed in a continuous-exercise workout. Interval intensity and duration, the length and type of rest interval, the number of work intervals (repetitions), and the number of repetition blocks (sets) per workout can all be modified in interval training. The work-recovery interval ratio is usually 1:1 or 1:1.5.

Continuous aerobic training. Continuous or long slow distance training involves steady-paced exercise performed at either moderate or high aerobic intensity (65 percent to 85 percent heart rate maximum) for a sustained duration. Overload generally occurs by increasing exercise duration, although the better one gets, the more it takes to improve.

Fartlek training. Fartlek training is speed play. Fartlek training is an adaptation of interval and continuous training that is well suited for exercising over natural terrain. With this system, alternate running is done at fast and slow speeds on both a level and hilly course.

Cross-training. Marines who train aerobically by running may find that lower impact aerobic activities such as cycling, swimming, deep-water running in place ("aquajogging"), and walking can complement their training. This may decrease common overuse and stress injuries. Cross-training workouts serve three major purposes: it provides a valid substitute for the training activities during injury periods; it also provides a mental break when a particular routine has gone flat. Moreover, cross-training can provide active rest-day activities. To provide active recovery, cross-training (supplemental) workouts generally will remain low intensity and brief in duration.

FITT Principle for cardiovascular endurance training.

Type:	Aerobic endurance exercise that uses large muscle groups, in rhythmic movements. Continuous aerobic, interval aerobic, fartlek aerobic training.
Frequency:	Minimum of 3 nonconsecutive days per week. Preferably 3 - 6 days per week for maximum benefit.
Duration:	Minimum of 20 minutes of continuous activity. Preferably 30 - 50 minutes.
Intensity:	65 percent to 85 percent HR max.
Progression:	Increase the frequency to 5 - 6 days per week. Increase the duration to 40 - 60 minutes. Exercising within the 65 percent to 85 percent HR max will insure progression. With cardiovascular adaptations the body will work harder to exercise within the training heart rate zone.

Conditioning Order. An important variable in fitness program is the sequence of exercises in the workout. The individual's strengths and weaknesses should be considered. The areas of weakness should demand priority in the "Training (*)" order.

Warm-up

- General warm-up.
- Specific activity warm-up.

Training

- Flexibility training.
- Motor skills training.
- Muscular strength training.
- Muscular endurance training.
- Cardiovascular endurance training.

Cool-down

- Decreased activity intensity.
- Stretching.

Recovery

Adaptations to Physical Training Programs. The main objective of physical training is to cause adaptations to improve performance in specific tasks. Training must be carefully planned and evaluated. Your body can be overtrained in which adaptation to the training is ineffective or in which risks of injury and illness can produce major setbacks. Proper exercise training and recovery will optimize one's ability to improve performance.

Energy requirements, sources and usage. An individual's ability to perform is based on the ability to gain needed energy. Energy requirements for an activity may be short term or long term. Lower-intensity, long-term performance requires more energy from aerobic (in the presence of oxygen) energy systems. Physical training that enhances the individual's ability for prolonged endurance activities is referred to as *aerobic* training or *endurance* training. In contrast, higher-intensity, short-term performance uses energy without the need for oxygen (anaerobic); this type of training is called *anaerobic* training. Anaerobic training consists of many different training modes (types), from lifting weights to sprint running.

Aerobic (cardiovascular endurance) training. Aerobic (endurance) training requires proper progression, variation, specificity and overload to improve performance. Many physical activities involve continuous movements mixed with bursts of sprint and power activities. Proper conditioning of the aerobic system is vital to an individual's ability to sustain these activities and adequately recover. You should be capable of sustaining low-intensity activities, most of which can be achieved using a wide variety of training methods and programs.

- Effects of aerobic training. Aerobic overload training significantly improves several functions related to oxygen uptake, transport and use. Aerobic conditioning:
    - Increases energy levels.
    - Increases ability to mobilize and burn fat for energy.
    - Increases energy stores in muscles.
    - Increases heart size.
    - Decreases resting heart rate.
    - Increases efficiency of the heart and circulatory system.

- Increases ability of the cardiorespiratory system to take-up and transport oxygen to working muscles.
- Increases capability of working muscles to take-up and use oxygen.
- Reduces blood pressure.

Anaerobic training. Anaerobic training involves a wide range of muscular strength and endurance training methods. Sprint workouts, stair running, plyometrics, and resistance training are all part of an anaerobic conditioning program. Anaerobic training requires proper progression, variation, specificity and overload for maximum adaptation and improvement.

- Effects of anaerobic training.
    - Increase in energy stores in muscles.
    - Increase muscle fiber size.
    - Delay the onset of fatigue.
    - Increase in muscle strength, endurance and power.
    - Increase in muscle tone.
    - Increase in sprint speed.
    - Increase in lean body mass (LBM).

Other conditioning benefits. Finally, there are other excellent benefits to be gained from a comprehensive aerobic and anaerobic conditioning program, including:

- Enhanced physical performance.
- Reduced risk of injury.
- Decreased rest and recovery.
- Decreased time needed to acclimatize to different environments and altitudes.
- Improved flexibility with stretching.
- Body weight management.
- Decreased tension.
- Improved sleep.
- Improved mood.
- Improved self-image.
- Increased tolerance of pain.
- Improved appetite control.
- Enhanced ability to inhibit anxiety and depression.

Chapter 3
Combat Physical Readiness Training (PRT)

"Even the bravest cannot fight beyond his strength."
- Homer: The Iliad, xiii, c. 1000 B.C.

All goals of physical training must support the physical requirements of combat. The idea that only infantry or reconnaissance units face the physical demands of combat is wrong. You should not allow this error to influence the priority they give to the physical readiness training of combat support, combat service support, aviation, and headquarters units. Units and their leaders that do not have the mental and physical strength to overcome fear will not be able to fight effectively. This chapter will familiarize you with the Marine Corps concept and perspective for Physical Readiness Training for Combat. Appendix C is a tool you can use to lead a physical training program.

History of Marine Physical Readiness. Every war has revealed Marine military physical deficiencies during the initial periods of mobilization (*Physical Readiness Training for Combat,* FMFRP 01-B). Frequently, casualties in initial engagements were attributed to "... the inability of Marines to physically withstand the rigors of combat over rugged terrain and under unfavorable climatic conditions." Costly lessons learned from Marine experiences in several wars over a period of years led to an increasing interest in the physical conditioning of Marines. Marines cannot afford to emphasize physical readiness during wartime and de-emphasize it during peacetime.

The Marine Corps Philosophy and Principles of Training. The history of battle, the experience of commanders, and the wisdom of Marine leaders all confirm the direct correlation between training and victory in battle. Successful combat units train as they intend to fight and fight as they are trained.

Mandate for physical readiness training (PRT). The Marine Corps mandate for physical readiness training is simple. Combat-ready units should be manned with motivated, disciplined, and proficient Marines "...conditioned through physically tough and mentally demanding training that runs from individual Marines, through drills to combined arms, to joint and combined exercises." Quality physical training in the Marine Corps must be a way of life. The battlefield fixes the directions and goals of training and makes rigorous physical, psychological and moral demands. Physical training must make Marines and leaders, "...physically and mentally tough enough to survive and to win..." under conditions of extreme fear and fatigue.

Physical Readiness Training Leadership. The *Physical Readiness Training for Combat* reference publication (FMFRP 0-1B) recognizes to be an effective leader in developing physical readiness, mind and attitude are also important to success. Leadership helps to "... promote an understanding of the value of physical readiness, maintain a positive approach, and seek cooperation and develop morale."

Understanding the value of physical readiness. The desire to be physically ready should be instilled in all Marines. Marines take greater interest in their individual physical fitness if they understand the benefits of physical training. Leaders should also impress "... the relation of physical readiness to survival in combat" on their Marines.

Developing morale. Combat physical readiness training is strenuous and demanding. It is a responsibility of leadership to create a positive atmosphere for training. For those Marines needing remedial training, an effective physical training program is essential to counter and eliminate weaknesses. As physical readiness grows, morale also grows.

Physical Demands of Combat. FMFRP 01-B describes three primary elements of effective physical training for combat: muscular strength and endurance, cardiovascular endurance, and a competitive, combative spirit.

Lower body physical demands. Demands of lower body flexibility, agility, muscular strength and endurance, and cardiovascular endurance include:

- Marching long distances under load and functioning effectively at the destination.
- Moving quickly and evasively under fire.
- Carrying wounded Marines to safety.

Upper body physical demands. Demands of upper body flexibility, agility, muscular strength and endurance, and cardiovascular endurance include:

- Rapidly employing crew-served weapons.
- Handling large-caliber ammunition.
- Clearing walls, cliffs and other obstacles.
- Performing field maintenance on aircraft or heavy machinery.

Competitive, combative spirit. Demands of a competitive, combative spirit include:

- Mental and emotional training.
- Vigorous physical conditioning.
- Physical aggressiveness.
- Overcoming natural physical fear, which leads to fatigue.

Combat Physical Readiness. *Physical Readiness Training (PRT) for Combat* states that total combat readiness includes both technical proficiency, and mental and physical fitness. It defines a physically fit Marine as one who can achieve a skillful and sustained performance and can recover from exertion rapidly. A physically fit Marine also has the desire to complete the assigned task and the confidence to face any situation.

Objective of combat physical readiness training. The objective of the Marine Corps PRT program is to develop individuals and units who are able and ready to accomplish the mission in

training and combat. Fitness programs can assist in attaining combat physical readiness by developing a Marine's flexibility, motor skills (agility, balance, coordination), muscular strength and endurance, and cardiovascular endurance.

Flexibility and motor skills training. A Marine must be able to change direction quickly and as effectively as possible. The ability to react effectively (agility) and to maintain body position during rapid changes of direction is important to survival. Agility is the ability to move all parts of the body in a balanced, efficient and concerted effort. Marines can develop their agility by developing balance, coordination, and reactive movements with plyometric exercises and obstacle courses.

Muscular strength and endurance training. Every Marine needs enough strength "...to perform the heaviest task encountered in routine and emergency activities." *Physical Readiness Training (PRT) for Combat* recognizes that strength is required in the arm and shoulder girdle, abdomen, back and legs. Performing both resistance and interval training will optimize a Marine's muscular strength and endurance.

Cardiovascular endurance training. Marines need stamina to exert a "...maximum ability without undue fatigue." Cardiovascular endurance will allow Marines to continue the fight under the most tiring combat conditions and to sustain near maximum effort over a longer period of time.

Principles of physical readiness. You should progress with a careful program of training to optimize physical readiness training benefits and minimize the risk of injury. A progressive overload program will bring you and your unit to a higher state of conditioning. An effective physical training program concurrently develops strength, endurance and basic motor skills. Some programs fail because the routine becomes boring. The more successful programs include conditioning activities (variety with progression), competitive events (knowledge of progress), and military physical skill development (application of progress). Training consistency is crucial, with frequent conditioning preferred.

Physical motor skills. Developing military physical skills is essential to personal safety and effective combat performance. As flexibility and agility are developed then higher physical skill levels can be attained:

- Marching under load.
- Sprinting and running for prolonged periods.
- Jumping to clear obstacles and jumping down from heights.
- Changing body direction rapidly while running.
- Vertically climbing ropes, poles, walls and cargo nets.
- Traversing horizontal ropes, pipes and ladders.
- High crawling and low crawling for speed and stealth.
- Throwing grenades for distance and accuracy.
- Vaulting low objects (fences and barriers) with hand assists.
- Carrying objects and evacuating casualties.

- Maintaining proper body balance on narrow walkways and at heights above normal.
- Contacting the ground from standing, running and jumping postures.

Physical Readiness Training Leadership Functions

Commanders' PRT leadership. Commanders at all levels should conduct unit physical training. To achieve this goal, commanders should:

- Lead by personal example.
- Instill command interest and present to everyone the importance of PRT to the welfare of the unit.
- Allot sufficient time for the achievement of objectives and monitor the use of PRT time.
- Assign and utilize qualified personnel to supervise and conduct PRT.
- Assess the physical readiness of individuals and units.
- Evaluate the program.

Subordinate leaders should.

- Schedule PRT using the principles of physical conditioning.
- Ensure that everyone participates in PRT.
- Establish an objective for each PRT program.
- Make remedial physical training available to strengthen individual weaknesses.
- Make PRT effective and efficient.
- Ensure that PRT follow the progressive overload principle.
- Insist on a positive approach to PRT.
- Guide small-unit leaders concerning approved techniques, directives and literature.
- Personally participate in PRT sessions.

Phases of Training Management. The Marine Corps has identified five phases of training management; analysis, design, development, implementation and maintenance. All five phases occur simultaneously.

Unit physical readiness training management

- Analysis and design. Planning requires a mission statement that includes goals and objectives, resources, and priorities. It also requires feedback from evaluation of current unit and individual proficiency. Commanders should analyze tasks performed by unit and individuals. They can then determine the specific conditioning needs such as muscular strength, muscular endurance, cardiovascular endurance, agility, and flexibility. Leaders must also assess the unit's and individual's current level of physical readiness. Deficient areas must be given

priority in the training program. To design a training program, short-, mid- and long-range needs (goals) should be developed.

- Development. Effective PRT programs should follow the concepts and principles previously described. Each training session should include a warm-up, physical conditioning, cool-down and recovery component. Conditioning exercises for all major muscle groups can be made from the needs analysis. Exercises developed for the physical conditioning component will follow the , or frequency, intensity, time and type of activity. The following periods are included in the training cycle.

  - General conditioning period. The general conditioning period is divided into three phases: muscular size and endurance, muscular strength, and muscular power. The first phase develops a conditioning base. This consists of nonspecific exercises that train all major muscle groups. During the strength phase, more activity-specific movements are introduced. Many of these exercises involve multiple joints and should be trained first. During the power phase, activity-specific motor activities should be placed first in the exercise session. This includes multiple-joint exercises such as plyometrics and speed drills.
    - Muscular size and endurance, and cardiovascular endurance (1-6 weeks, nonspecific activities. As time approaches the PRT program-activities should become more specific: low-intensity and high-repetitions, follow appropriate recovery guidelines.)
    - Muscular strength (Gradually phase in more specific training activities. Increase intensity to 80 percent maximum with moderate-repetitions, follow recovery guidelines.)
    - Muscular power (Gradually phase in more specific training activities. Increase intensity to 90 percent maximum with low-repetitions, full recovery between bouts of exercise.)
    - Emphasize PT gear, limit frequency of boots and utilities.

  - Transition period. The next period is the transition period, where the Marine performs all activities at a low level of intensity and repetitions. This allows for physical recovery and mental preparation.
    - Duration of 1-2 weeks.
    - Phase in specific PRT program activities.
    - Low-intensity and high-repetition levels.
    - Follow recovery guidelines.
    - Emphasize PT gear, increase frequency of boots and utilities, and combat loads.

  - Specific PRT period. The transition period progresses to a more specific, high-intensity and low-repetition level program.
    - Duration of months.
    - Specific PRT program activities.
    - High intensity and low-repetition levels.
    - Follow recovery guidelines.

- Increase training frequency in boots and utilities, and combat loads.

- PRT program maintenance period. The last period is a maintenance period. During this time, activities are less structured and nonspecific or specific.
  - Duration of months.
  - Nonspecific or specific PRT program activities.
  - Low-intensity and low-repetition levels.
  - Limit psychological stress from specific training.
  - Moderate training frequency in boots and utilities, and combat loads.

- Implementation. Military units are inherently different in organization and mission. The PRT program must be tailored to the mission and to the current physical condition of most unit personnel. A warm-up, physical conditioning, cool-down and recovery period should be included to minimize the risk of musculoskeletal injuries. Training programs must be balanced to reduce the risk of joint injury.

- From the PRT program objectives, determine the training emphasis (muscular strength, cardiovascular endurance, flexibility, etc.)
- Determine the place, frequency and time required.
- Organize for various group sizes and determine levels of monitoring and
- supervision.
- Plan for seasonal, environmental condition, and training area changes.
- Consider facilities needed.
- Specify appropriate uniforms.
- Specify qualified instructors.
- Secure command participation and support.

- Maintenance. Once the training program is initiated, individuals should maintain physical readiness as a lifestyle. Evaluating a training program's progress, like chow and camouflage, is continuous. This allows the commander to ensure that training is mission-oriented and builds toward combat physical readiness. Unit leaders, individual training performance, and the trainers themselves should be evaluated and critiqued to ensure that PRT sessions are constructive and progressive.

Individual PRT management. Regardless of military occupational specialty, individuals should maintain a high level of readiness in order to meet the demands of combat.

- Physically substandard Individuals. By following the unit's physical readiness training management, supervisors can strengthen individual weaknesses and improve unit readiness. Leaders can:
  - Conduct an assessment to identify individual areas of weakness.
  - Design individualized training to strengthen weaknesses.
  - Develop an individualized training program based on the unit training plan.

  - Determine and provide the level of supervision for the physical training

sessions.
- Periodically evaluate the training program to determine training progression, motivation of the Marine, and to reevaluate supervisory needs.

Physical Readiness Training Courses. As discussed in earlier sections, physical readiness courses can vary in duration, intensity, and muscular or cardiovascular demands. Your physical fitness areas and resources can be adapted to accommodate these types of courses.

Circuit courses. Circuit courses intermix exercises (active rest) with sprinting or fast running interval training (work). Circuit courses will be run in PT gear. The work interval should take two to three seconds to two minutes to complete. The circuit repetitions can be run 3-6 times with appropriate active rest (intermixed exercises) intervals. The distance of the intervals can be fixed or varied between 20 meters to 600 meters. The exercises should be specific to progress to movements in the other courses.

Assault courses. Assault courses simulate physical demands that might be encountered in an actual combat assault. The assault course is run in combat loads (boots and utilities with full load bearing vest (LBV), helmet, flak jacket and rifle). The assault course should have a combination of 12 to 14 high and low obstacles spread over a 600-800 meter circuit with a time limit of about 4.5 to 9 minutes. Obstacles can be separated by 20 to 80 meters. The course can be combined with a rope climb at the beginning (and at the end) and a fireman's carry on a flat course 60-80 meters long progressing to 200 meters. Assault courses should be designed to develop aerobic and anaerobic energy systems.

Battle courses. Battle courses can be designed to develop small unit cohesion. The battle course should be at least five miles and is negotiated by small units of four to six individuals under the direction of a fire team leader who ensures appropriate tactical formations and fire and. movement techniques as the unit advances from obstacle to obstacle. Intervals of sprints, fast running, easy running, and resistance running up hill are mixed with crawling, rolling, jumping, and climbing over obstacles. The course can include rope climbs, commando crawls, vertical/incline/ladder walls, barbed wire tanglefoot crawls, balance logs, fighting positions, and water obstacles. Units can carry logs, resupply items, or stretchers with simulated casualties, attack bunkers or perform whatever mission the commander chooses to vary his objective. Each individual is in combat load gear.

Endurance courses. Endurance courses are designed to develop cardiovascular and muscular endurance over a prolonged period. They are run over a six mile circuit wearing combat loads. The courses alternate low and medium obstacles with short steep hills. Some obstacles should require Marines to low/high crawl 15 to 30 meters.

Conditioning ‘speed’ marches. Speed marches develop the aerobic conditioning system continuously over an extended period of time. Speed marches should be between 4 and 9 miles with a 10 to 12 minute per mile pace. Speed marches will be conducted wearing combat loads. Different protocols have been established for conducting the speed marches with a 10-12 minute per mile pace (6 miles/hour), for example, “...hiking uphill and running on the downhill and

flats." With added weight, however, running on the downhill exposes the knees to increased risk of ligament and cartilage damage, and should be limited.

Conditioning marches with a load. Conditioning marches are designed to develop Marines' load bearing, long-term energy system over an extended period. Hikes are conducted wearing gear to include combat loads and pack. Conditioning marches should follow the progression principle of training. Hikes can be made progressively more challenging by adding distance or weight, for example.

The circuit courses, assault courses, endurance courses and conditioning marches should be introduced and conducted using the principles of progressive overload and recovery. This should minimize the risk of injuries. PRT programs should follow the conditioning model, including a general and specific warm-up period, stretching before and after, and a cool-down period with recovery. Proper nutrition is critical during prolonged conditioning periods. Hydration is crucial, using electrolyte replacements after three hours of activity. Leaders must ensure that individuals have a good pair of well-broken-in boots. Medical personnel, if involved from the planning and initiation of any activity, can provide invaluable preventive measures and post-exercise evaluations.

Chapter 4
Marine Corps Water Survival Training Program

This section details the individual qualification events required for the Marine Corps Water Survival Training Program (MCWSTP) which are considered Marine Corps Common Skills (MCCS) that apply to all Marines. The Water Survival Program qualification events are broken down into three levels: Water Survival Basic (WSB); Water Survival Intermediate (WSI); Water Survival Advanced (WSA). Each individual event contained provides an event title, along with the conditions events will be performed under, and the standard to which the event must be performed to be successful. Each event must be passed consecutively before moving on to the next event level.

INDEX OF EVENTS BY LEVEL

1. WATER SURVIVAL BASIC (WSB) EVENTS

MCCS-WSB-1001: Execute 25 meter swim assessment
CONDITION: Given an aquatic environment with shallow water and while wearing the combat uniform.
STANDARD: Without touching the bottom or sides, without stopping and without assistance.
PERFORMANCE STEPS:
1. Enter the water.
2. Swim 25 meters.
3. Exit the water.

ADMINISTRATIVE INSTRUCTIONS: Survival strokes: Breaststroke, elementary backstroke, left sidestroke, right sidestroke, beginner stroke on front, and beginner stroke on back. The combat uniform is defined as follows; blouse, trousers, and boot. Shallow water is defined as greater than 3 feet and less than 5 feet of water. The swimmer is to be evaluated on the ability to safely swim 25 meters, not on the quality of the strokes used.

MCCS-WSB-1002: Conduct self rescue
CONDITION: Given an aquatic environment with deep water, a height of 8 to 10 feet, and while wearing the combat uniform.
STANDARD: ***Without injury, in performance step sequence, for 25 meters, utilizing one or*** more of the survival strokes, and without assistance or artificial flotation..
PERFORMANCE STEPS:
1. Enter the water from a height.
2. Orient to surface.
3. Clear a breathing space while surfacing.
4. Orient to safety.
5. Swim to safety utilizing one or a combination of survival strokes.

ADMINISTRATIVE INSTRUCTIONS: Survival strokes: Breaststroke, elementary backstroke, left sidestroke, right sidestroke, beginner stroke on front, and beginner stroke on back. The combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water.

MCCS-WSB-1003: Stay on the surface
CONDITION: Given an aquatic environment with deep water and a Marine wearing the combat uniform.
STANDARD: For 4 minutes.
PERFORMANCE STEPS:
1. Enter the water.
2. Utilize one or a combination of personal water survival techniques.
3. Exit the water.

ADMINISTRATIVE INSTRUCTIONS: Surface survival techniques: Treading water, sweep method, T-method, blouse inflation, and trouser inflation. The combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water.

MCCS-WSB-1004: Conduct gear shed
CONDITION: Given an aquatic environment, while in shallow water, and wearing the combat uniform with a full combat load.
STANDARD: In less than 10 seconds, prior to surfacing until only the combat uniform remains.
PERFORMANCE STEPS:
1. Submerge.
2. Remove combat load.
3. Surface.

ADMINISTRATIVE INSTRUCTIONS: Head and body may surface; face must be under water while removing the combat load. The full combat load identified in the condition will be dependent on the unit each Marine is assigned. The minimum gear required is as follows; Flak

w/ballistic inserts, service rifle, and a helmet. The combat uniform is defined as follows; blouse, trousers, and boot. Shallow water is defined as greater than 3 feet and less than 5 feet of water. Do not use raised platforms due to risk of injury.

MCCS-WSB-1005: Employ floatation gear
CONDITION: Given an aquatic environment with deep water, using a properly waterproofed pack, and while wearing the combat uniform.
STANDARD: For a distance of 25 meters without loss of gear.
PERFORMANCE STEPS:
1. Enter the water.
2. Gain control of pack.
3. Maintain control of pack.
4. Move to safety utilizing one of the pack retention methods.

ADMINISTRATIVE INSTRUCTIONS: Pack retention methods: Pack in abdomen face-down, pack in abdomen face-up, and grasping with one hand. No platform will be used due to risk of injury. The combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water.

2. WATER SURVIVAL INTERMEDIATE (WSI) EVENTS

EVENT	DESCRIPTION	PAGE
MCCS-WSI-2001	Employ floatation gear	7-8
MCCS-WSI-2002	Conduct self rescue	7-8
MCCS-WSI-2003	Stay on the surface	7-9
MCCS-WSI-2004	Conduct gear shed	7-10

MCCS-WSI-2001: Employ floatation gear
CONDITION: Given an aquatic environment, a properly waterproofed pack, while wearing the **combat uniform with a full combat load.**
STANDARD: For a distance of 50 meters, in shallow and deep water, without loss of gear.
PERFORMANCE STEPS:
1. Enter shallow water.
2. Remove combat load.
3. Secure combat load to a properly waterproofed pack.
4. Walk 25 meters in shallow water pushing or towing gear.
5. Swim 25 meters in deep water pushing or towing gear.
6. Exit water.

ADMINISTRATIVE INSTRUCTIONS: The full combat load identified in the condition will be dependent on the unit each Marine is assigned. The minimum gear required is as follows; Flak w/ballistic inserts, service rifle, and a helmet. The combat uniform is defined as follows; blouse, trousers, and boot. Shallow water is defined as greater than 3 feet and less than 5 feet of water. Deep water is defined as greater than 9 feet of water.

MCCS-WSI-2002: Conduct self rescue
CONDITION: Given an aquatic environment with deep water, a height of 8 to 10 feet, and while wearing the combat uniform.
STANDARD: Without injury, in performance step sequence, for 250 meters, utilizing one or more of the survival strokes, and without assistance or artificial flotation.
PERFORMANCE STEPS:
1.Enter the water from a height.
Orient to surface.
3. Clear a breathing space while surfacing.
4. Orient to safety.
5. Swim to safety utilizing one or a combination of survival strokes.

ADMINISTRATIVE INSTRUCTIONS: Survival strokes: Breaststroke, elementary backstroke, left sidestroke, right sidestroke, beginner stroke on front, and beginner stroke on back. The combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water.

MCCS-WSI-2003: Stay on the surface
CONDITION: Given an aquatic environment with deep water, while wearing the combat uniform.
STANDARD: In performance step sequence, floating for 10 minutes.
PERFORMANCE STEPS:
1. Enter water.
2. Execute blouse inflation.
3. Remove boots and retain on person.
4. Execute trouser inflation.
5. Exit water.

ADMINISTRATIVE INSTRUCTIONS: The Marine will perform a 2 minute blouse inflation and an 8 minute trouser inflation in a total of 10 minutes. The combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water.

MCCS-WSI-2004: Conduct gear shed
CONDITION: Given an aquatic environment, while in deep water, and wearing the combat uniform with a full combat load.
STANDARD: Without surfacing, in less than 20 seconds, until only the combat uniform remains.
PERFORMANCE STEPS:
1. Submerge.
2. Remove combat load.
3. Surface.

ADMINISTRATIVE INSTRUCTIONS: Head and body may surface; face must be under

water while removing the combat load. The full combat load identified in the condition will be dependent on the unit each Marine is assigned. The minimum gear required is as follows; Flak w/ballistic inserts, service rifle, and a helmet. The combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water. Do not use raised platforms due to risk of injury.

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3. WATER SURVIVAL ADVANCED (WSA) EVENTS

MCCS-WSA-2011: Perform survival strokes
CONDITION: Given an aquatic environment with deep water and while wearing the combat uniform.
STANDARD: Using proper techniques for a distance of 25 meters per stoke for a total of 75 meters.
PERFORMANCE STEPS:
1. Enter the water.
2. Perform breaststroke.
3. Perform sidestroke.
4. Perform backstroke.
5. Exit the water.

ADMINISTRATIVE INSTRUCTIONS: The combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water.

MCCS-WSA-2012: Conduct self rescue
CONDITION: Given an aquatic environment with deep water, a height of 8 to 10 feet, and while wearing the combat uniform.
STANDARD: Without injury, in performance step sequence, for 500 meters, utilizing one or more of the survival strokes, and without assistance or artificial flotation.
PERFORMANCE STEPS:
1. Enter the water from a height.
2. Orient to surface.
3. Clear a breathing space while surfacing.
4. Orient to safety.
5. Swim to safety utilizing one or a combination of survival strokes.

ADMINISTRATIVE INSTRUCTIONS: Survival strokes: Breaststroke, elementary backstroke, left sidestroke, right sidestroke, beginner stroke on front, and beginner stroke on

back. The combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water.

MCCS-WSA-2013: Conduct buddy assist (active victim)
CONDITION: Given an aquatic environment, rescue device and a victim in deep water, while wearing a combat uniform.
STANDARD: Without injury or loss of life.
PERFORMANCE STEPS:
1. Identify victim.
2. Enter the water with rescue device.
3. Swim to the victim.
4. Present rescue device to the victim.
5. Assist the victim to safety.

ADMINISTRATIVE INSTRUCTIONS: Active drowning victim must be wearing a combat uniform. The combat uniform is defined as follows; blouse, trousers, and boot. In order to demonstrate mastery, a Marine must assist victim for 25 meters and use a properly waterproofed pack as the rescue device.

MCCS-WSA-2014: Conduct buddy assist (passive victim)
CONDITION: Given an aquatic environment, rescue device and a victim in deep water, while wearing a combat uniform.
STANDARD: Without injury or loss of life.
PERFORMANCE STEPS:
1. Identify victim.
2. Enter the water with rescue device.
3. Swim to the victim.
4. Maneuver the victim onto the rescue device so that the victim's face remains out of the water.
5. Tow the victim to safety.

ADMINISTRATIVE INSTRUCTIONS: Passive drowning victim must be wearing a combat uniform. The combat uniform is defined as follows; blouse, trousers, and boot. In order to demonstrate mastery, a Marine must assist victim for 25 meters and use a properly waterproofed pack as the rescue device.

MCCS-WSA-2015: Rescue victim
DESCRIPTION: When performing this event the situation will dictate which techniques should be used. In order to demonstrate mastery, a Marine must be able to perform all types of escapes,

level-offs, and tows.

CONDITION: While wearing a combat uniform, given an aquatic environment, and a victim wearing a full combat load and combat uniform in deep water 20 meters from the rescuer.

STANDARD: Without injury to the rescuer so that the victim's face remains out of the water for a distance of 10 meters.

PERFORMANCE STEPS:

1. Identify victim.
2. Enter the water.
3. Swim to the victim.
4. Perform a swimmers assist as required.
4. Perform appropriate escape technique as required.
5. Perform appropriate level-off technique as required.
6. Perform appropriate tow technique as required.
7. Move the victim to safety.

ADMINISTRATIVE INSTRUCTIONS: The victim's full combat load identified in the condition will be dependent on the unit each Marine is assigned. The victim's minimum gear required is as follows; Flak w/ballistic inserts, service rifle, and a helmet. The rescuer's and victim's combat uniform is defined as follows; blouse, trousers, and boot. Deep water is defined as greater than 9 feet of water. Escape techniques are as follows; front head hold escape, rear head hold escape, and wrist grip escape. Level-off techniques are as follows; single armpit level-off and double armpit level-off. Tow techniques are as follows; wrist tow, collar tow, cross-chest carry, single armpit tow, and double armpit tow.

FLIGHT STATUS PERSONNEL: Personnel assigned/pending assignments to flight status are required to qualify at a minimum of Water Survival Advanced (WSA). This is a one-time requirement, and is the prerequisite for follow-on swim training. Normal water survival training will continue thereafter.

Chapter 5

Combat Fitness Test

The Marine Corps has developed a Combat Fitness Test (CFT), that all Marines must pass, in addition to the standard Marine Corps Physical Fitness Test (PFT). At this time, the CFT is pass/fail, but -- beginning in July 2009, the Marine Corps will establish points for these events, and they will count toward Marine Corps promotion points, just as the PFT currently does.

The CFT consists of three events: an 880 yard run, ammo can lifts, and maneuver under fire:

Movement To Contact (MTC)

(1) This is a timed event that can be conducted either indoors or outdoors.
(2) The preparatory command is "Ready" and the execute command is "Go."

(3) The run course will be 880 yards and must be measured for accuracy and set over reasonably level ground. Prior to the conduct of this event, the CCI/CPTR will ensure the running surface is free from hazards or debris that can cause injury to MTC participants.
(4) This event can be conducted on a track or measured surface and should not include numerous sharp turns that would force a participant to slow down excessively to remain on the course. A wide turnaround point will be implemented to prevent Marines from having to stop and turnaround, causing a loss in time on the event.
(5) Running this event on a treadmill is not authorized.
(6) The goal of this event is for Marines to complete the measured course as quickly as possible.

Ammunition Lift (AL)

(1) This is a timed event with a 2-minute time limit.
(2) This event can be conducted either indoors or outdoors.
(3) The preparatory command is "Ready" and the execute command is "Go."
(4) The AL is a repetitive lift of a 30-pound ammunition can from shoulder height to overhead.
(5) Prior to the start of the AL, Marines will be paired up by weight (within 10 pounds) and by approximate height in order to facilitate efficient transition to the MANUF.
(6) The partner counting repetitions will be located to the side (approx. 90 degree angle) of the Marine performing the AL in order to observe elbow lockout and prevent injury should the participant drop or return the ammunition can to the deck.
(7) When Marines are conducting the AL within close proximity, participants will conduct the event facing away from each other.
(8) Starting position for the AL is to hold the ammunition can sideways at shoulder height with both hands, handle facing away from the participant. The proper lifting technique is head up, chest elevated and lumbar curve maintained. Feet will remain shoulder-width apart or staggered in a basic-warrior stance position.
(9) The ammunition can must be lifted to a point overhead where the elbows are momentarily locked out. The ammunition can does not have to be lifted directly overhead. Once lock out is achieved, the ammunition can will be lowered to a point where the top of the can is at or below chin level. Once the ammo can is returned to this level, this counts as one repetition. To reach this level Marines may have to widen the distance between elbows. The top of the ammunition can is to remain parallel to the deck throughout the entire movement.

(10) A repetition will be counted when a correct and complete overhead lift is performed.
(11) Marines are encouraged to use their legs to generate upward momentum of the ammunition can, especially when fatigued. There is no penalty if Marines choose not to use their legs. Alteration of stance during the AL is permissible.
(12) Marines are authorized to rest during the AL. The ammunition can may be held in the starting position or placed on the deck. If placed on the deck, the ammunition can will be lowered in a controlled movement and not thrown or dropped. Once lowered to the deck, no assistance can be provided when returning the ammunition can to the starting position. Proper technique will be utilized when returning to the starting position.
(13) The CCI or CPTR will monitor the event ensuring elbows are locked out and the ammunition can is lowered to a point at or just below the chin.
(14) The goal of this event is to complete as many correct and complete repetitions as possible in the 2-minute time limit.

Maneuver Under Fire (MANUF)

(1) The MANUF is a timed event to be conducted outdoors. The MANUF course should be constructed on a smooth and level grass surface, preferably a football or soccer field. Prior to the conduct of this event, the CCI/CPTR will ensure the running surface is free from hazards or debris that can cause injury to participants.

(2) The MANUF is a 300 yard shuttle run that includes a variety of combat-related tasks, to include crawls, buddy drags/carries, ammunition resupply, grenade throw and agility running. See Tables 3-1 and 3-2 for MANUF layout.
(3) The number of monitors required is dependent upon the amount of lanes necessary to facilitate maximum throughput of a single running.
(4) The CCI or CPTR is the primary MANUF monitor. Each lane will have one field monitor positioned at the 25 yard line. One grenade pit observer will verify 2 lanes. The rank requirement for MANUF monitors is NCO or above. Grenade pit observers can be any rank. Monitors may rotate as necessary and are authorized to participate in the CFT. Mass starts for the MANUF is not necessary and individual field monitors can start Marines in their individual lanes upon approval of the CCI or CPTR. For example, if eight MANUF lanes are established, thirteen monitors/observers are required: One primary MANUF monitor, eight field monitors and four grenade pit observers.
(5) Prior to execution, the primary monitor will partner Marines by weight (within 10 pounds) and approximate height (within 6 inches) and assign a lane.
(6) Prior to execution, the primary monitor will ensure partnered pairs are assigned lanes based upon MTC times (from fastest to slowest). Marines with the fastest MTC times will execute the MANUF first in order to ensure a uniform pace that facilitates overall supervision and safety of participants. The Marine from the partnered pair not executing the MANUF first will serve as the Simulated Casualty (SC).
(7) Prior to execution, the primary monitor will direct designated SCs to proceed to the 75 yard line; sit up facing away with legs straight; one yard inboard from the right lateral limit of the assigned lane.
(8) Prior to execution, a dummy grenade will be placed in the center of each lane at the 75 yard line.
(9) Prior to execution, the primary monitor will ensure MANUF participants confirm their lane and SC location.
(10) Marines will start the MANUF while lying in the prone; chest on the ground; one yard inboard from the right lateral limit of the designated lane; on line with the SC located at the 75 yard line. Staggering placement of the legs is permitted.
(11) The preparatory command is “Ready” and the execute command is “Go.” On the command “Go” Marines will rise and sprint to the 25 yard line.
(12) Upon reaching the 25 yard line, Marines will decelerate and execute a forward facing clockwise turn (“J” hook) around the marker placed one yard inboard from the right lateral limit of the lane. Once the forward facing turn has been executed, Marines will assume a high crawl position.

(13) With their chest on or behind the 25 yard line following the "J" hook, Marines will drop and execute a high crawl for 10 yards. The high crawl is characterized by the Marine maintaining contact with the ground with elbows, knees and torso.
(14) After high crawling 10 yards to the 35 yard line, Marines will then execute a modified high crawl for 15 yards to the 50 yard line. The modified high crawl is characterized by the Marine maintaining six (6) points of contact (hands, knees, and feet) with the ground.
(15) After reaching the 50 yard line, Marines will rise and negotiate a network of cones (utility flags/other markers) for 25 yards until reaching the 75 yard line. The SC will be seated at the 75 yard line with legs straight and forearms clasped together.
(16) Upon reaching the SC from the rear, Marines will prepare to conduct a casualty drag by reaching underneath and through the arms of the SC and obtaining a solid grasp on both forearms. Marines will then lift and drag the SC 10 yards through the first two cones at the 65 yard line. Marines will utilize proper lifting techniques by keeping the head up, chest elevated and the natural curve of the lumbar spine maintained. Field monitors may verbally guide Marines dragging the SC through the nearest two cones.
(17) Once the feet of the SC have passed the second cone, the field monitor will direct "Casualty Stand." Once the SC is fully erect, Marines will lift the SC into the Fireman's Carry position. Marines will utilize proper lifting techniques by keeping the head up, chest elevated and buttocks down. The Marine will ensure the SC is placed high on the shoulders. The SC will place the palm of one hand in the small of the back of the Marine doing the carry for support. Marines will then transport the SC 65 yards straight back to the start line without negotiating the remainder of the cone network. Stopping to rest and/or readjust is permitted.
(18) Once the SC is passed through the start line, Marines will place the SC safely on the ground and lift two ammunition cans weighing 30 pounds each. Marines will utilize proper lifting techniques by keeping the head up, chest elevated and buttocks down. The Marine will transport the two 30 pound ammunition cans back to the 75 yard line, negotiating the cone network while en route.
(19) Upon reaching the 75 yard line, Marines will place the ammunition cans next to the dummy grenade while utilizing a good lowering technique by bending at the knees.
(20) Marines will pick up the dummy grenade and engage the grenade target from the standing position. After the grenade is thrown, Marines will immediately drop to the deck and execute three pushups. The grenade pit observer will signal to the field monitor both verbally and via hand signal whether the grenade throw was a hit or miss.
(21) To be counted as a hit, grenade throws must land directly in the grenade pit or strike the line marking the area. If the grenade lands in the grenade pit area, but rolls out, the throw is considered a hit. The field monitor will report the results of the grenade throw to the Marine after completion of the MANUF. Five seconds will be deducted from the overall MANUF time for hits and five seconds will be added to the overall MANUF time for misses.
(22) After conducting three properly executed push ups, Marines will pick up the ammunition cans, utilizing proper lifting techniques by keeping the head up, chest elevated and buttocks down. After negotiating the cone network, Marines will transport the ammunition cans back to the start line. The primary monitor will ensure a five yard buffer zone is maintained between the start/finish line and any personnel/equipment.
(23) The primary monitor will sound off as event time elapses. The field monitor will provide grenade throw results. Marines will provide MANUF times and grenade throw results at the conclusion of the event. Scores will be calculated as follows: For example, a Marine with an overall MANUF time of 2:42 and had a hit on the grenade throw portion would report "2:42 with a hit." The Marine recording will mark the overall time for this Marine as 2:37.

(24) The goal of this event is for Marines to complete the measured course as quickly as possible.

Performance. The minimum performance requirements for Marines to pass the CFT are contained in table 3-3. Marines must meet or exceed the minimum performance requirements for each event.

CFT Minimum Requirements

MALE				
	17-26	**27-39**	**40-45**	**46+**
MTC	**4:13**	**4:31**	**5:07**	**5:09**
AL	**33**	**28**	**17**	**16**
MANUF	**3:58**	**4:42**	**5:59**	**6:07**
FEMALE				
	17-26	**27-39**	**40-45**	**46+**
MTC	**5:27**	**5:28**	**5:35**	**5:50**
AL	**17**	**13**	**7**	**6**
MANUF	**5:59**	**6:04**	**6:25**	**6:30**

Table 3-3. -- CFT Minimum Performance Requirements

Classification. CFT passing criteria has been derived from extensive testing of a wide sample population representing all demographics that comprise the Marine Corps Total Force. There are no differences or separate events based on gender or age. Maximum and minimum performance criteria were established utilizing specific performance percentiles, by age group. Marines must achieve the minimum performance requirement for all three events to successfully pass the CFT. Failure to meet the minimum requirement in any one event constitutes a failure of the entire test. CFT classifications for males/females for all age groups are as follows:

CFT Classifications

1st Class	270-300
2d Class	225-269
3rd Class	190-224
Fail	189 and Below

Table 3-4. – CFT Classifications

Score. The CFT is a scored event. Calculating a cumulative score for a completed CFT can be derived from Tables 3-5 through 3-7.

MOVEMENT TO CONTACT

	17-26		27-39		40-45		46+	
TIME	M	F	M	F	M	F	M	F
2:45	100	X	X	X	X	X	X	X
2:46	99	X	X	X	X	X	X	X
2:47	99	X	X	X	X	X	X	X
2:48	98	X	X	X	X	X	X	X
2:49	98	X	X	X	X	X	X	X
2:50	97	X	X	X	X	X	X	X
2:51	97	X	100	X	X	X	X	X
2:52	96	X	99	X	X	X	X	X
2:53	96	X	99	X	X	X	X	X
2:54	95	X	98	X	X	X	X	X
2:55	95	X	98	X	X	X	X	X
2:56	95	X	97	X	X	X	X	X
2:57	94	X	97	X	X	X	X	X
2:58	94	X	97	X	X	X	X	X
2:59	93	X	96	X	X	X	X	X
3:00	93	X	96	X	X	X	X	X
3:01	92	X	95	X	X	X	X	X
3:02	92	X	95	X	X	X	X	X
3:03	91	X	95	X	100	X	X	X
3:04	91	X	94	X	99	X	X	X
3:05	91	X	94	X	99	X	100	X
3:06	90	X	93	X	99	X	99	X
3:07	90	X	93	X	99	X	99	X
3:08	89	X	93	X	98	X	99	X
3:09	89	X	92	X	98	X	99	X
3:10	88	X	92	X	98	X	98	X
3:11	88	X	91	X	97	X	98	X
3:12	87	X	91	X	97	X	98	X
3:13	87	X	91	X	97	X	97	X
3:14	87	X	90	X	97	X	97	X
3:15	86	X	90	X	96	X	97	X
3:16	86	X	89	X	96	X	96	X
3:17	85	X	89	X	96	X	96	X
3:18	85	X	88	X	95	X	96	X
3:19	84	X	88	X	95	X	95	X
3:20	84	X	88	X	95	X	95	X
3:21	83	X	87	X	94	X	95	X
3:22	83	X	87	X	94	X	95	X

Table 3-5. - Movement to Contact

MOVEMENT TO CONTACT

	17-26		27-39		40-45		46+	
TIME	M	F	M	F	M	F	M	F
3:23	83	100	86	X	94	X	94	X
3:24	82	99	86	X	93	X	94	X
3:25	82	99	86	X	93	X	94	X
3:26	81	98	85	X	93	X	93	X
3:27	81	98	85	X	92	X	93	X
3:28	80	98	84	X	92	X	93	X
3:29	80	97	84	X	92	X	92	X
3:30	79	97	84	100	91	X	92	X
3:31	79	97	83	99	91	X	92	X
3:32	79	96	83	99	91	X	91	X
3:33	78	96	82	98	90	X	91	X
3:34	78	96	82	98	90	X	91	X
3:35	77	96	82	98	90	X	90	X
3:36	77	95	81	97	89	X	90	X
3:37	76	95	81	97	89	X	90	X
3:38	76	95	80	97	89	X	89	X
3:39	75	94	80	96	88	X	89	X
3:40	75	94	80	96	88	X	89	X
3:41	75	94	79	96	88	X	88	X
3:42	74	93	79	95	87	X	88	X
3:43	74	93	78	95	87	X	88	X
3:44	73	93	78	95	86	X	87	X
3:45	73	92	78	94	86	X	87	X
3:46	72	92	77	94	86	X	87	X
3:47	72	92	77	94	85	X	86	X
3:48	71	91	76	93	85	X	86	X
3:49	71	91	76	93	84	100	86	X
3:50	71	91	76	93	84	99	85	X
3:51	70	90	75	92	84	99	85	X
3:52	70	90	75	92	84	98	85	X
3:53	69	90	74	92	83	98	84	X
3:54	69	90	74	91	83	98	84	X
3:55	68	89	74	91	83	97	84	100
3:56	68	89	73	91	82	97	84	99
3:57	67	89	73	90	82	96	83	99
3:58	67	88	72	90	82	96	83	99
3:59	67	88	72	90	81	96	83	99
4:00	66	88	72	89	81	95	82	98
4:01	66	87	71	89	81	95	82	98
4:02	65	87	71	89	80	95	82	98
4:03	65	87	70	88	80	94	81	97
4:04	64	86	70	88	80	94	81	97

Table 3-5. - Movement to Contact

AMMO LIFT

REPS	17-26		27-39		40-45		46+	
	M	F	M	F	M	F	M	F
97	x	x	100	x	x	x	x	x
96	x	x	99	x	x	x	x	x
95	x	x	99	x	x	x	x	x
94	x	x	98	x	x	x	x	x
93	x	x	98	x	x	x	x	x
92	x	x	97	x	x	x	x	x
91	100	x	97	x	x	x	x	x
90	99	x	96	x	x	x	x	x
89	99	x	95	x	100	x	x	x
88	98	x	95	x	99	x	x	x
87	97	x	94	x	99	x	x	x
86	97	x	94	x	98	x	100	x
85	96	x	93	x	98	x	99	x
84	95	x	92	x	97	x	99	x
83	94	x	92	x	97	x	98	x
82	94	x	91	x	96	x	98	x
81	93	x	91	x	96	x	97	x
80	92	x	90	x	95	x	97	x
79	92	x	90	x	95	x	96	x
78	91	x	89	x	94	x	95	x
77	90	x	88	x	93	x	95	x
76	90	x	88	x	93	x	94	x
75	89	x	87	x	92	x	94	x
74	88	x	87	x	92	x	93	x
73	88	x	86	x	91	x	93	x
72	87	x	86	x	91	x	92	x
71	86	x	85	x	90	x	91	x
70	86	x	84	x	90	x	91	x
69	85	x	84	x	89	x	90	x
68	84	x	83	x	88	x	90	x
67	83	x	83	x	88	x	89	x
66	83	x	82	x	87	x	89	x
65	82	x	81	x	87	x	88	x
64	81	x	81	x	86	x	87	x
63	81	x	80	100	86	x	87	x
62	80	x	80	99	85	x	86	x
61	79	x	79	98	85	x	86	x
60	79	100	79	98	84	x	85	x
59	78	99	78	97	84	x	85	x
58	77	98	77	96	83	x	84	x
57	77	97	77	95	82	x	83	x
56	76	96	76	94	82	x	83	x
55	75	95	76	94	81	x	82	x
54	74	94	75	93	81	x	82	x
53	74	93	74	92	80	x	81	x
52	73	93	74	91	80	x	81	x

Table 3-6. – Ammo Lift

MANEUVER UNDER FIRE

TIME	17-26		27-39		40-45		46+	
	M	F	M	F	M	F	M	F
2:14	100	X	X	X	X	X	X	X
2:15	99	X	X	X	X	X	X	X
2:16	99	X	X	X	X	X	X	X
2:17	98	X	X	X	X	X	X	X
2:18	98	X	X	X	X	X	X	X
2:19	97	X	X	X	X	X	X	X
2:20	97	X	X	X	X	X	X	X
2:21	97	X	X	X	X	X	X	X
2:22	96	X	X	X	X	X	X	X
2:23	96	X	X	X	X	X	X	X
2:24	96	X	X	X	X	X	X	X
2:25	95	X	X	X	X	X	X	X
2:26	95	X	100	X	X	X	X	X
2:27	94	X	99	X	X	X	X	X
2:28	94	X	99	X	X	X	X	X
2:29	94	X	99	X	X	X	X	X
2:30	93	X	99	X	X	X	X	X
2:31	93	X	99	X	X	X	X	X
2:32	93	X	98	X	X	X	X	X
2:33	92	X	98	X	X	X	X	X
2:34	92	X	98	X	100	X	X	X
2:35	91	X	97	X	99	X	X	X
2:36	91	X	97	X	99	X	X	X
2:37	91	X	97	X	99	X	X	X
2:38	90	X	96	X	99	X	X	X
2:39	90	X	96	X	98	X	X	X
2:40	90	X	96	X	98	X	X	X
2:41	89	X	96	X	98	X	X	X
2:42	89	X	95	X	98	X	X	X
2:43	88	X	95	X	98	X	X	X
2:44	88	X	95	X	97	X	X	X
2:45	88	X	94	X	97	X	X	X
2:46	87	X	94	X	97	X	X	X
2:47	87	X	94	X	97	X	X	X
2:48	87	X	94	X	97	X	X	X
2:49	86	X	93	X	97	X	X	X
2:50	86	X	93	X	96	X	X	X
2:51	85	X	93	X	96	X	X	X
2:52	85	X	92	X	96	X	100	X
2:53	85	X	92	X	96	X	99	X
2:54	84	X	92	X	96	X	99	X
2:55	84	X	92	X	95	X	99	X
2:56	84	X	91	X	95	X	99	X
2:57	83	X	91	X	95	X	98	X
2:58	83	X	91	X	95	X	98	X
2:59	82	X	90	X	95	X	98	X
3:00	82	X	90	X	94	X	98	X

Table 3-7. - Maneuver Under Fire

MANEUVER UNDER FIRE

TIME	17-26		27-39		40-45		46+	
	M	F	M	F	M	F	M	F
3:01	82	100	90	X	94	X	98	X
3:02	81	99	89	X	94	X	97	X
3:03	81	99	89	X	94	X	97	X
3:04	81	99	89	X	94	X	97	X
3:05	80	99	89	X	93	X	97	X
3:06	80	99	88	X	93	X	97	X
3:07	79	99	88	100	93	X	96	X
3:08	79	98	88	99	93	X	96	X
3:09	79	98	87	99	93	X	96	X
3:10	78	98	87	99	93	X	96	X
3:11	78	98	87	99	92	X	96	X
3:12	78	98	87	98	92	X	95	X
3:13	77	97	86	98	92	X	95	X
3:14	77	97	86	98	92	X	95	X
3:15	76	97	86	98	92	X	95	X
3:16	76	97	85	97	91	X	95	X
3:17	76	96	85	97	91	X	94	X
3:18	75	96	85	97	91	X	94	X
3:19	75	96	85	97	91	X	94	X
3:20	74	96	84	97	91	X	94	X
3:21	74	96	84	96	90	100	94	X
3:22	74	95	84	96	90	99	93	X
3:23	73	95	83	96	90	99	93	X
3:24	73	95	83	96	90	99	93	X
3:25	73	95	83	95	90	99	93	X
3:26	72	95	82	95	90	98	93	X
3:27	72	94	82	95	89	98	92	X
3:28	71	94	82	95	89	98	92	X
3:29	71	94	82	95	89	98	92	X
3:30	71	94	81	94	89	98	92	X
3:31	70	93	81	94	89	97	92	X
3:32	70	93	81	94	88	97	91	X
3:33	70	93	80	94	88	97	91	X
3:34	69	93	80	93	88	97	91	X
3:35	69	93	80	93	88	96	91	X
3:36	68	92	80	93	88	96	91	X
3:37	68	92	79	93	87	96	90	X
3:38	68	92	79	93	87	96	90	X
3:39	67	92	79	92	87	96	90	X
3:40	67	91	78	92	87	95	90	X
3:41	67	91	78	92	87	95	90	X
3:42	66	91	78	92	86	95	89	X
3:43	66	91	78	91	86	95	89	X
3:44	65	91	77	91	86	95	89	100
3:45	65	90	77	91	86	94	89	99
3:46	65	90	77	91	86	94	88	99

Table 3-7. – Maneuver Under Fire

Source: Marine Corps Order 6100.13W (Physical Fitness)

Chapter 6

Physical Fitness Test (PFT) Requirements

"Take care that you be strong. (Cura ut aleas)"

- Roman Maxim

The Marine Corps PFT is a collective measure of general fitness and is specifically designed to test the strength and stamina of the upper body, midsection, and lower body, as well as efficiency of the cardiovascular and respiratory systems. Marines must maintain the ability to pass the test at any time, and are tested at least semi-annually. For more information on the Marine Corps physical fitness program go to *https://fitness.usmc.mil/Pages/home.aspx*.

- Conduct. The test will be conducted in a single session. Movement from one event to another should provide adequate rest between events. Events may be conducted in any sequence prescribed by the unit commander. Marines may wear appropriate gym attire or a seasonally modified utility uniform.

Test Events and Standards

*PFT for **male***. The test consists of three events: pull-ups/chin-ups, abdominal crunches, and a 3-mile run. These events are designed to test the strength and stamina of the upper body (shoulder girdle), the midsection, and the lower body. Additionally, the run measures the efficiency of the cardiovascular system. To successfully pass the test, a Marine must complete the minimum requirements for each event, plus earn the required additional points for his age group. Failure to meet the required minimum in any event constitutes failure of the entire test, regardless of total number of points earned. Minimum acceptable performance standards and required minimum scores are listed below. However, the minimum performance in each event will not achieve the overall points required for a passing score. ***Additional points must be earned in at least one even in order to achieve a 3rd Class PFT or better.***

Required minimum acceptable performance (male)

Age	*Pull-ups (repetitions)*	*Abdominal Crunches (repetitions)*	*3-Mile Run (minutes)*	*Total Points*	***Passing Score***
17-26	3	50	28	105	**135**
27-39	3	45	29	94	**110**
40-45	3	45	30	88	**88**
46+	3	40	33	65	**65**

*PFT for **female***. The test consists of three events: the flexed arm hang, abdominal crunches, and the 3-mile run. These events are designed to test the strength and stamina of the upper body

(shoulder girdle), the midsection, and the lower body. Additionally, the run measures the efficiency of the cardiovascular system. To successfully pass the test, a Marine must complete the minimum requirements for each event, plus earn the required additional points for his age group. Failure to meet the required minimum in any event constitutes failure of the entire test, regardless of total number of points earned. Minimum acceptable performance standards and required minimum scores are listed below. However, the minimum performance in each event will not achieve the overall points required for a passing score. ***Additional points must be earned in at least one even in order to achieve a 3rd Class PFT or better.***

Required minimum acceptable performance (female)

Age	Flexed Arm Hang *(seconds)*	*Abdominal* Crunches *(repetitions)*	*3-Mile* Run *(minutes)*	Total *Points*	Passing *Score*
17-26	15	50	31	105	135
27-39	15	45	32	94	110
40-45	15	45	33	88	88
46+	15	40	36	65	65

Required Minimum Scores to Pass

Age	*Unsatisfactory*	*3rd Class*	*2nd Class*	*1st Class*
17-26	0-134	135	175	225
27-39	0-109	110	150	200
40-45	0- 87	88	125	175
46+	0-64	65	100	150

The point system is shown in the performance chart in *table 6-3*.

Performance of Events

Pull-ups (male). The bar is grasped with both palms facing either forward or to the rear and the arms are fully extended (dead hang). Feet must be free of the ground. The position of the hands may be changed during the exercise as long as the performer is not assisted or does not dismount from the bar. Pull your body up with the arms until your chin is over the bar, then lower yourself until the arms are fully extended again; this is one repetition. The movement must be fully extended again; this is one repetition. The movement must be fully completed to count. Repeat as many times as possible. The body will be kept from swinging by an assistant holding an extended arm in front of the knees of the Marine on the bar. Resting is allowed in the up or down position, but resting with the chin supported by the bar is not allowed.

Flexed Arm Hang (female). The individual stands on a support or, if necessary, is assisted by others to reach the starting position. Both palms must face in the same direction. The elbows are flexed so that the chin is over or level with the bar. Once the individual is set in the starting position, the support or assistance is removed and she attempts to maintain elbow flexion for as long as possible. The score is the length of time in seconds that some degree of flexion at the elbow is maintained. The chin may not rest on the bar during the exercise.

Note: Effective 1 January 2014, pull-ups will replace the Flexed Arm Hang. To pass the pull-up portion, females will be required to execute at least three pull-ups. Scoring for the pull-ups is as follows:

Points	Pull-ups
100	8
95	7
85	6
75	5
65	4
40	3

Abdominal Crunches. The time limit is two minutes for male and female Marines. In the correct starting position, the Marines are on their back (supine position) with their shoulder blades touching the deck, knees flexed and both feet flat on the deck. The arms are folded across and remain against the chest or rib cage with no gap between the forearms and the chest or rib cage when raising the upper body. One repetition consists of raising the upper body from the starting position until the elbows or forearms touch the thighs and then returning to the starting position with the shoulder blades touching the deck. No bouncing or arching of the lower back is authorized, and the buttocks will remain in constant contact with the deck throughout the exercise. An assistant may hold the feet or legs below the knees in whatever manner is most comfortable for the participant. Kneeling or sitting on the feet is permitted. Repeat as many times as possible during the time limit. Resting during the exercise is permitted in either the up or the down position.

Run. The object of this event is to complete the measured course as rapidly as possible. Walking is allowed. Both male and female Marines will run a 3-mile course.

Points System

Points	*3-mile run (time)*		*Hang (sec.)*	*Pull-up*	*Abdominal Crunches (2 min.)*
	Male	Female	Female	Male	Both
100	18:00	21:00	70	20	100
99	18:10	21:10			99
98	18:20	21:20	69		98
97	18:30	21:30			97
96	18:40	21:40	68		96
95	18:50	21:50		19	95
94	19:00	22:00			94
93	19:10	22:10			93
92	19:20	22:20	66		92
91	19:30	22:30			91
90	19:40	22:40	65	18	90
89	19:50	22:50			89
88	20:00	23:00	64		88
87	20:10	23:10			87
86	20:20	23:20	63		86
85	20:30	23:30		17	85
84	20:40	23:40	62		84
83	20:50	23:50			83
82	21:00	24:00	61		82
81	21:10	24:10			81
80	21:20	24:20	60	16	80
79	21:30	24:30			79
78	21:40	24:40	59		78
77	21:50	24:50			77
76	22:00	25:00	58		76
75	22:10	25:10		15	75
74	22:20	25:20	57		74
73	22:30	25:30			73
72	22:40	25:40	56		72
71	22:50	25:50			71
70	23:00	26:00	55	14	70
69	23:10	26:10			69
68	23:20	26:20	54		68
67	23:30	26:30			67
66	23:40	26:40	53		66
65	23:50	26:50		13	65
64	24:00	27:00	52		64
63	24:10	27:10			63
62	24:20	27:20	51		62
61	24:30	27:30			61

60	24:40	27:40	50	12	60
59	24:50	27:50			59
58	25:00	28:00	49		58
57	25:10	28:10			57
56	25:20	28:20	48		56
55	25:30	28:30		11	55
54	25:40	28:40	47		54
53	25:50	28:50			53
52	26:00	29:00	46		52
51	26:10	29:10			51
50	26:20	29:20	45	10	50
49	26:30	29:30			49
48	26:40	29:40	44		48
47	26:50	29:50			47
46	27:00	30:00	43		46
45	27:10	30:10		9	45
44	27:20	30:20	42		44
43	27:30	30:30			43
42	27:40	30:40	41		42
41	27:50	30:50			41
40	28:00	31:00	40	8	40
39	28:10	31:10	39		X
38	28:20	31:20	38		X
37	28:30	31:30	37		X
36	28:40	31:40	36		X
35	28:50	31:50	35	7	X
34	29:00	32:00	34		X
33	29:10	32:10	33		X
32	29:20	32:20	32		X
31	29:30	32:30	31		X
30	29:40	32:40	30	6	X
29	29:50	32:50	29		X
28	30:00	33:00	28		X
27	30:10	33:10	27		X
26	30:20	33:20	26		X
25	30:30	33:30	25	5	X
24	30:40	33:40	24		X
23	30:50	33:50	23		X
22	31:00	34:00	22		X
21	31:10	34:10	21		X
20	31:20	34:20	20	4	X
19	31:30	34:30	19		X
18	31:40	34:40	18		X
17	31:50	34:50	17		X
16	32:00	35:00	16		X

15	32:10	35:10	15	3	X
14	32:20	35:20	X	X	X
13	32:30	35:30	X	X	X
12	32:40	35:40	X	X	X
11	32:50	35:50	X	X	X
10	33:00	36:00	X	X	X
9	X	X	X	X	X
8	X	X	X	X	X
7	X	X	X	X	X
6	X	X	X	X	X
5	X	X	X	X	X
4	X	X	X	X	X
3	X	X	X	X	X
2	X	X	X	X	X
1	X	X	X	X	X

Table6-3. POINTS SYSTEM (CONTINUED)

Source: Marine Corps Order 6100.13W (Physical Fitness)

Chapter 7
Injury Prevention and Rehabilitation

"No price is too great to preserve the health of the fleet."
- Lord St. Vincent: Letter to the Admiralty, 1796

When you perform vigorous physical activity and training, you risk injuries to muscles, bones, tendons, or ligaments, also known as musculoskeletal injuries. Most training injuries result from excessive intensity, duration, or frequency of a physical training activity. You must understand the potential for injuries associated with physical activity and training. Therefore, training routines should be based on each individual's physical fitness level and potential risk factors. The majority of exercise-related injuries can be prevented by the use of good judgment and moderation. Periodic re-evaluation of training should be conducted, especially if warning signs of injury such as pain, fatigue or markedly decreased performance occur. It is important to recognize certain conditions or warning signs that could lead to injury. If an injury does occur, the individual should cease training and receive prompt treatment. Individuals should seek medical attention when an injury is severe or if symptoms persist after rest and first aid measures. **Moreover, proper rehabilitation is critical to avoid the recurrence of an injury**. The earlier the injuries are identified, evaluated, and aggressively treated, the more quickly you can get back on duty or to training.

Occurrence of Musculoskeletal Injuries. Musculoskeletal injuries are the most frequent type of injuries encountered during training and in operational environments other than combat. Fortunately, many severe and minor musculoskeletal injuries are preventable if recognized and treated early. Conditioning programs that involve vigorous weight-bearing activities increase injury rates. The optimal physical conditioning program includes a combination of weight-bearing and nonweight-bearing activities.

Risk Factors for Injuries. Risk factors for weight bearing, physical training-related injuries are categorized as either extrinsic or intrinsic.

- Extrinsic risk factors. Extrinsic factors are variables external to the individual, such as training parameters, environmental conditions, equipment, and technique.

- Training parameters

  - Training errors. Higher risks of injury are associated with greater frequency, higher intensity, and longer training sessions. To minimize the risk of injury, you should progress with any new activity gradually so that the overloaded muscles, tendons, and ligaments have time to recover. Fortunately, you can easily modify training frequency, duration, and intensity to reduce the risks of injury.
  - Type of training. The type of activity also determines the risks of injury. Repetitive-motion, weight-bearing exercises, such as running, conditioning

marches, and other such training, commonly lead to overuse injuries such as stress fractures and Achilles tendonitis. Activities which require dexterity, balance, and skill - such as the Obstacle Course, cycling, and skiing, more often lead to traumatic, acute injuries (broken bones or severe sprains).

- Environmental conditions. Running up and down hills places more stress on the musculoskeletal system. Various surfaces such as roads, sidewalks, trails, or grass will also affect the risks of injury for running and conditioning marches. Running on softer, more shock-absorbent, but irregular surfaces such as trails or grass may reduce the risk of overuse injuries, but increase the risk of acute traumatic injuries such as ankle sprains.
- Equipment. Using improper training equipment also affects the risks of injury. Cross-trainers may be used in several athletic activities, but cushioning, support, and stability for specific events are sacrificed for economy. Old or worn footwear may equate to having an anatomic defect and result in injuries.
- Technique. Improper and outdated physical training activities, stretching, and lifting techniques also place Marines at risk for musculoskeletal injuries.
- Intrinsic factors. Intrinsic factors pertain to the individual's anatomy, biomechanics, or physiology. Some factors include poor flexibility, lack of physical fitness, and inadequate rehabilitation.
- Flexibility. Individuals with very little flexibility may sustain more muscle and tendon strains, whereas those who are highly flexible experience more sprains and dislocations.
- Physical fitness. Those who are less fit experience higher relative levels of physiologic and biomechanical stress at any given level of activity.
- Inadequate rehabilitation. Failure to rehabilitate an injury may leave a muscle, tendon, or ligament weak, predisposing it to injury.

Training Injuries. Injuries from physical training can be broadly classified as either acute (traumatic) or chronic (overuse) injuries. *Figure 7-1* provides a summary of common injuries.

Acute injuries. Acute traumatic injuries result when ligaments, bones or muscle-tendon units are subjected to an abrupt force, such as twisting an ankle on a trail or breaking a bone in contact with an obstacle, i.e., an opponent's jaw. The two most common traumatic injuries are sprains and strains.

- Sprains. Injuries to ligaments are termed sprains. Ligaments are connective tissues that connect bones or cartilage; they provide support and strength to joints. Sprains are classified into three categories: first, second, and third degree.

  - First-degree sprains. First-degree sprains occur when the fibers within the ligament are stretched. There is mild pain and swelling but no joint instability.

- Second-degree sprains. Second-degree sprains are more severe, with partial tearing of the ligament and possibly the joint capsule. There is severe pain and swelling and considerable loss of strength. A second-degree sprain inadequately treated may result in further injury or complete tearing of the ligament.

- Third-degree sprains. Third-degree sprains result from a complete tear of the ligament. There is severe pain at the time of injury and obvious joint instability. Third degree sprains usually require reconstructive surgery and should be promptly evaluated by an orthopedic surgeon (bone doctor).

- Strains. Strains are commonly referred to as "muscle pulls" and generally result from stretching or tearing muscle tissue. Strains are classified as first-, second- or third-degree strains by the severity of muscle damage and the resulting loss of function.

  - First-degree strains. First-degree strains produce mild signs and symptoms with minimal local pain. There is often a sensation of muscle tightness with activity.

  - Second-degree strains. Second-degree strains are more severe, with partial tearing of the injured muscle. There is substantial pain, considerable loss of function, and discoloration from bruising.

  - Third-degree strains. Third-degree strains cause marked muscle disruption and possible avulsion of the muscle-tendon unit. These injuries usually require surgical intervention and should also be promptly evaluated by a bone doctor.

  - Muscle strain restoration. Most strains of the lower extremity are mild to moderate in severity but may require up to three weeks for recovery. More severe muscle strains may require several months to heal. Muscle strains often recur, particularly if there has been inadequate rehabilitation. Both flexibility and strength of the injured part should be restored to near full capacity before returning to activity.

- Fractures and dislocations. Fractures (broken bones) and dislocations (separation of joints) are more serious but less frequent injuries. Individuals with these injuries should be immobilized and transported immediately to an appropriate medical facility for evaluation and treatment.

- Blisters. Blisters result from friction between the skin and equipment. The blister top should remain intact and be covered with sterile dressing to promote faster healing and reduce the risk of infection. If the blister is painful and must be punctured, this should be done in sterile conditions. The area should remain clean and covered.

Chronic injuries. Overuse injuries result from small, repetitive, overload forces on the musculoskeletal system. Although some degree of trauma is likely with any training program, these small repetitive forces may eventually result in a noticeable injury. Common overuse injuries include tendonitis, strains, sprains, and stress fractures.

- Tendonitis. Tendonitis, or painful inflammation of a tendon, results from the repetitive stress of forceful muscle contractions. Tendon overload occurs more frequently with eccentric (lengthening) muscle contractions, such as running downhill or lowering weight, than with concentric contractions (shortening).
- Sprains and strains. Many sprains and strains are acute injuries. When they result from or are aggravated by overuse, they are then classified as chronic injuries. Whatever the cause, the symptoms are the same as for acute injuries but are generally milder. Treatment is the same as for acute injuries.
- Stress fractures. Most stress fractures from overuse occur to the lower extremities, especially in the tibia of the leg and metatarsals of the feet. They occur in response to repetitive overloading forces to bones during activities such as running, walking or marching. Any individual with aching bone pain from exercise which does not abate in a few days or worsens should be evaluated by appropriate medical personnel.
- Shin splints. "Shin splints" (i.e., shin soreness) is a vague term for overuse injuries involving the lower leg. This injury may involve inflammation or stresses to the muscle-tendon units attached to the tibia or the bone itself. Rapid changes in intensity, frequency or duration of activities such as running, walking, marching, or biking can result in these conditions.
- Low back injuries. Low back pain is a common symptom of injury either associated with or exacerbated by exercise. Low back pain resulting from a musculoskeletal injury may indicate damage to the vertebrae, discs, or the back and abdominal muscles. If neurological symptoms develop, i.e., pain radiating into the buttocks or down one or both legs, numbness or tingling in the legs, or weakness, a physician should be consulted. Chronic back pain of unknown origin and severe pain are additional reasons to consult a physician.

  - Initial care of back injuries. The most common causes of low back pain are sprains or strains. Initial treatment consists of rest, ice and anti-inflammatory medication such as aspirin or Motrin. A few days of complete bed rest may also be beneficial, but longer periods of complete rest may be counterproductive.
  - Preventing back injuries. The best strategy for preventing back strains and sprains is an overall conditioning program that includes nonballistic stretching of the back muscles, hamstrings and hip muscles and exercises specifically to strengthen not only the back but the abdomen as well.

- Overuse injury care. Pain occurring at the beginning of exercise, disappearing during activity, and then returning in the cool down phase indicates a soft tissue injury. Pain

that persists during exercise and improves with rest suggests bone injury. Immediate care is essentially the same for all overuse conditions: active rest, ice, compression, elevation and anti-inflammatory medication.

Basic Principles of Care for Musculoskeletal Injuries. The objectives of initial treatment of training-related injuries are to decrease pain, limit swelling and excessive inflammation that might slow the healing process, and prevent further injury. In acute injuries, these objectives may be accomplished by a combination of rest, ice, compression and elevation of the injured part (RICE). Chronic injuries may require additional treatment modalities, such as heat or ultrasound, and therapeutic exercises. Anti-inflammatory medication may be helpful for both chronic and acute injuries.

Rest. For both acute and chronic conditions, the initial rest period should be at least 24 to 48 hours until inflammation has lessened. For some mild cases of acute and chronic conditions, rest may be "active rest," requiring only a decrease in the intensity, duration and frequency of exercise. In most cases normal exercise may be resumed when activity is pain free.

Ice. Ice and other cold applications (cryotherapy) are used to reduce swelling, bleeding, inflammation, and pain. Cryotherapy is especially helpful in the first 24 to 72 hours following acute injuries. For chronic injuries, cold applications help limit inflammation, particularly when daily activities reactivate the inflammatory process. Common types of cold therapy include ice packs, ice baths, ice towels, ice massage, gel packs, and chemical packs. The type, duration and frequency of application of cold should be specifically tailored for each injury. Application of ice should be for only 20 minutes, or increased swelling and bleeding may result.

- Acute injuries. Cold applications may be used on acute injuries every hour for the first several hours (20 minutes on, 40 minutes off). Later, they can be applied twice a day if pain has diminished. Some injuries, especially those to the hands or feet, may be immersed in a cold-water bath made by adding ice to cold water.

- Chronic injuries. For chronic injuries, ice massage with ice frozen in a paper cup is an effective means to apply cold locally. Slow, circular movements are applied for 20 minutes. Brief applications may be sufficient for tendonitis, bursitis and sprains. Ice massage two to three times per day with range-of-motion exercises can be effective in treating these chronic injuries. Caution should be used as cold injuries may result from improper application.

Compression. Compression helps to reduce swelling and bleeding. It is achieved with direct pressure or elastic wraps. Compression enhances the benefits of cold and may be applied simultaneously by wrapping an ice pack over an elastic bandage. Care should be taken not to compromise circulation with excessive compression.

Elevation. Elevating the injured area decreases blood flow and excessive pressure. This allows gravity to assist in tissue drainage and decreasing swelling. For elevation to be most effective, the injured extremity should be raised above the level of the heart and placed on a comfortable padded surface.

Heat. Heat therapy (thermotherapy) is a commonly used treatment to relieve pain, increase blood flow, and reduce stiffness. Heat therapy should not be used until two to three days after an acute injury because it may increase swelling. Furthermore, heat should not be applied when swelling and bleeding persist because it may aggravate inflammation. Heat application is not advised for patients with impaired sensation, skin circulation or thermal regulation.

Anti-inflammatory medication. Nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin, ibuprofen (Motrin), or naproxen (Naprosyn/Anaprox) are used to treat both acute and chronic musculoskeletal injuries. They are most beneficial in relieving chronic inflammatory conditions like tendonitis and bursitis and are also good pain relievers. Acetaminophen (Tylenol) is not an NSAID but is a good analgesic. Therefore, it is useful to relieve pain but not to reduce inflammation. All medication should be taken as directed by a physician.

Preventing Musculoskeletal Injuries. Many musculoskeletal injuries can be prevented or made less serious by reducing or eliminating risk factors. Prevention includes a gradual progression of training, the individualization of exercise activities, a good warm-up and cool-down, proper stretching, and use of appropriate equipment. A comprehensive program of physical fitness will also assist in injury prevention. Such a program includes stretching, strength training, endurance training, proper lifting techniques, and good motor skills.

Progression of training. Probably the most common mistake individuals make is progressing too quickly. The cardiorespiratory and musculoskeletal systems must be overloaded to make improvements in physical fitness. If the overload is too great too soon, however, the systems break down rather than building up (overtraining principle). For optimal fitness improvements and injury prevention, training should increase gradually. This will allow the body to recover.

Individualization of training. Optimally, a physical fitness program should be balanced to develop all fitness components (endurance, strength, flexibility, etc.). To improve fitness and prevent injuries, an individual's program should be tailored to him or her to some extent. As the individual's fitness and experience increase, he or she can progressively increase the duration, intensity and frequency of exercise.

Warm-up. A structured warm-up prepares the body for more vigorous activity and will reduce the risk of injury. Adequate warm-up allows a gradual redistribution of blood flow to the muscles. The increased blood flow to exercising muscle has a literal warming effect, which increases the elasticity of connective tissue and other muscle components. The warm-up should last 15 to 20 minutes, gradually progressing to target activity levels and involving large muscle groups.

Cool-down. An appropriate cool-down period is recommended to allow the body to gradually return to the resting state. The cool-down should last 10 to 15 minutes and involve the same large muscle groups as the exercise activity.

Stretching. Stretching exercises increase or maintain the range of motion of joints. This theoretically reduces the risk of injury to tight muscles and joints with constricted range. Static stretching is recommended - NO bouncing. The stretch position of an exercise should be held from 10 seconds to 60 seconds. Stretching should be performed AFTER muscles are warmed up and may be incorporated into the warm-up and cool-down routine.

Protective equipment. The most important item of equipment for weight-bearing activities is a good shoe or boot. Individuals should select appropriate footwear offering maximum protection for a particular activity. The shoe should provide adequate shock absorbency, heel stability, forefoot flexibility and durability for the activity. For instance, a running shoe is designed with the right amount of shock absorbency for the impact of running and appropriate lateral stability. It does NOT have the right amount of lateral support, traction and durability for basketball which requires more lateral support. Individuals who hyperpronate or supinate may require a prescription for orthotics if they experience injuries associated with physical training or activity. All footwear should be well maintained and replaced or resoled when excessive wear is apparent.

Proper lifting techniques. Establishing a good base of support (i.e., feet at shoulder width apart and one foot ahead of the other) and maintaining the natural curves of the spine when lifting or reaching will reduce the risk of back injury. The back muscles, tendons and ligaments are most efficient in this position. Individuals should also keep their center of gravity within their base of support to reduce the risk of injury.

Proper exercise biomechanics. Total body strength is important to prevent back problems. The back is supported by the back, abdominal, and upper leg muscles. Weights should always be lifted using the leg muscles. If the legs are not strong, there is a greater demand on the muscles, tendons and ligaments of the back.

Monitoring warning signs of injury. When you are training and/or if you *are in leadership position you should monitor for signs of early or impending injury*. Fatigue or lack of enthusiasm are indicators that exercise intensity or frequency is too great, or that rest and recovery are inadequate. The remedy for these symptoms is decreased intensity and frequency of activity, and in some instances a period of complete rest before resumption. Pain is another important warning sign. It indicates that a body part has been overstressed or injured. Training should be curtailed until the pain improves or abates. If adequate changes in training are not made in response to warning signs, overuse injuries will result.

Proactive injury prevention strategy. A proactive injury prevention strategy will optimize performance and increase readiness and productivity. Again, a program of musculoskeletal injury prevention involves:

- Proper physical training warm-up.
- Proper stretching.
- Proper physical training progression.
- Proper strengthening program.
- Proper endurance program.

- Cool-down.
- Proper lifting techniques and equipment.
- Monitoring warning signs.

Rehabilitation. As stated earlier, failure to rehabilitate an injury may leave a muscle, tendon, or ligament weak, predisposing it to injury. Rehabilitation is defined as restoration, not only to daily activity but to physical training. The three phases of rehabilitation are immediate care, restoring range of motion and strength, and return to physical training. If Marines include these three phases in their recovery, they will greatly reduce the chance of recurrent injuries.

Immediate care. Immediate care includes applying the RICE principle as explained previously in paragraph 4.

Restoring range of motion (ROM) and strength. ROM and strength exercises should begin as soon as pain free activity is possible. This phase is the most crucial part of rehabilitation. RICE is usually applied during this phase as well to hasten progress in ROM and strength.

- ROM. ROM exercises are used to improve the joint range of motion and muscle flexibility. ROM exercises can be either passive or active.
- Strength exercises. Strength exercises are applied after ROM is established. They are specific to the injured part and range from performing isometric contractions (applying force against an immovable object) to using exercise machines.

Return to physical training. After the individual has regained his ROM and strength, he or she should develop the endurance, motor skills, and proprioception (sensory awareness of one's position in space) necessary to return to play.

Summary of Common Physical Training Induced Chronic (Overuse) Injuries

Type	Location	Signs/Symptoms	Treatment
Bursitis	Bony prominence Bursae	Pain, swelling, warmth, limitation of motion.	RICE* Anti-inflammatory**
Tendonitis	Tendon	Pain, swelling, limitation of motion.	RICE* Anti-inflammatory**
Patellar-femoral syndrome	Knee cap, patellar tendon, cartilage, ligament	Pain, grating, instability.	RICE* Anti-inflammatory**
Sprain	Ligament	Same as acute but milder.	RICE* Anti-inflammatory**
Strain	Muscle, muscle-tendon unit	Same as acute but milder.	RICE* Anti-inflammatory**
Stress fracture	Bone	Persistent pain, X-ray/Bone scan.	RICE* Anti-inflammatory**
Low back injury	Vertebrae, disk, ligament, muscles of back	Pain, limitation of motion, neurological symptoms.	RICE* Anti-inflammatory**
Shin splints	Bone, tendon, fascia of lower leg	Pain, swelling.	RICE* Anti-inflammatory**
Metatarsalgia	Bone, joint, nerves of foot	Pain, swelling.	RICE* Anti-inflammatory**

Figure 7-1

Jones BH, Reynolds KL, Rock PB, Moore MP, "Exercise-Related Musculoskeletal Injuries: Risks, Prevention, and Care", Resource Manual for Guidelines for Exercise Testing and Prescription, American College of Sports Medicine, 2nd ed., Lea & Febiger, Philadelphia, PA, 1993:378-393.

* RICE = Active Rest, Ice, Compression, Elevation.

** Reconstructive surgery may be required.

Chapter 8
A Guide to Nutrition

"The stomach carries the feet."

- Cervantes, 1547-1616

Good nutrition is essential to prepare you for the intensive training you will receive with the Marine Corps. Nutritional modification has been shown over and over to improve athletic performance. The sooner you begin a healthy, well balanced diet which contains all the essential macronutrients and micronutrients the better chance you will have of successfully completing your training. This Chapter focuses on what constitutes a healthy nutritional lifestyle, how to use nutrition to optimize physical performance and weight management, and how leaders can encourage positive changes in these areas.

Energy. Energy may be defined as the capacity or ability to do work. Food consumed in the form of carbohydrate, fat, or protein molecules provides energy to the body. If a Marine is trained for periods of low-level (60 to 70 percent aerobic capacity) activity, the body can derive up to 80 percent of its energy needs from fat stores. Carbohydrates (glycogen) are not only preserved for the brain and nervous system but remain available to support sudden intense (anaerobic) activity, i.e., sprinting or climbing obstacles.

Basic Foods and Functions. The body needs more than 50 known nutrients. These nutrients are divided into six classes: carbohydrates, protein, fats, vitamins, minerals and water. The three essential energy nutrients are carbohydrates, proteins, and fats. Given the active lifestyles of the average Marine, his or her daily intake should consist of 60-70 percent carbohydrates, 15-25 percent protein and 10-20 percent fat. This is also the amount suggested by the Recommended Dietary Allowance (RDA).

Carbohydrates: Carbohydrates are chemical compounds composed of saccharide (sugar) units. Dietary carbohydrates are one of the most important nutrients for both health and performance as they are the basic energy-producing source for the body. It is the body's short-term energy source, providing four calories of work for every gram of carbohydrates. Marines involved in heavy endurance activities and training (prolonged conditioning marches) often require 70 percent or more caloric intake from carbohydrates. The two types of carbohydrates are simple and complex. One gram of carbohydrate supplies four kilocalories (KCal) of energy.

- Simple carbohydrates. Simple sugars include glucose, fructose, and sucrose (table sugar), and can be found in foods such as candy, cake, soda and jelly. They supply "empty calories" with few useful nutrients. The RDA recommends that only 10 percent of total calories come from simple sugars.
- Complex carbohydrates. Complex carbohydrates are made from chains of simple sugars and include foods such as pasta, bread, cereal, rice, fruits, and vegetables.
- Glucose. Most ingested (dietary) carbohydrates are initially converted into blood glucose and used for energy. Blood glucose is the best fuel for muscles.

- Stored glucose. Blood glucose is stored as glycogen in muscle, the liver and bloodstream. Glycogen is an efficient source of energy. After the glycogen stores are filled, the remaining glucose is converted to fat for long-term storage.
- Fiber. Dietary fiber is the nondigestible portion of carbohydrate. The best sources are foods high in complex carbohydrates. Fiber may benefit weight management by creating a feeling of fullness without a high level of calories.

- Main source of energy.
- Limiting factor on how long you can exercise.
- It is necessary to eat more complex carbohydrates
- Helps weight control, lowers cholesterol.
- Aim for 25-35 grams of fiber every day.

Good Fiber Sources: Apples, bananas, strawberries, carrots, pears, corn, broccoli, beans, whole wheat bread, sunflower seeds, oatmeal, Cheerios, Kashi Cereals, Shredded Wheat

- Protein: These are chemical compounds composed of amino acids and are found in both plant and animal products. They are the body's builders, maintainers and repairers of tissue cells, production of hormones, an essential component of immune system. They produce important compounds like enzymes and hormones. Eight of the 20 amino acids in proteins are essential, meaning they cannot be manufactured by the body and must be supplied in the diet. Protein from both plant and animal sources generally contains all the essential amino acids and is considered "complete." Protein rich foods include beef, fish, chicken, cheese, milk, soy, beans, nuts, and rice. One gram of protein supplies four KCal of energy. There are four calories per gram of protein.

Guidelines (excessive protein intake has no positive effect on the body)

Average Adult: Daily intake 0.36 grams per pound of body weight
Athletes: Daily intake 0.45-.68 grams per pound of body weight

Fats and cholesterol: Fats are the long-term forms of energy for the body. Fat is stored in large quantities in adipose tissue and represents a large potential energy source during low-intensity activities. They help the body use other nutrients more efficiently. Dietary fats are categorized as either saturated or unsaturated. They transport and store the fat-soluble vitamins A, D, E, and K. They also provides insulation for vital organs. One gram of fat supplies nine KCal of energy, more than twice that of proteins and carbohydrates combined. The RDA for dietary fat states that no more than 30 percent of one's total calories should come from fat, and no more than 10 percent of daily calories should be from saturated fat.

- Saturated fats (bad fats) come primarily from animal products (meat, cheese, whole milk), and tropical oils (Vegetable sources of saturated fat include coconut oil, palm oil and cocoa butter). Saturated fats are solid at room temperature. Saturated fats are widely used in commercially prepared foods (crackers, cookies

and pastries). Because they can become a significant source of fat in the diet, saturated fats should be minimized.

- Unsaturated fat are considered good fats and include most vegetable oil and help decrease cholesterol levels. Unsaturated fats are liquid at room temperature. Polyunsaturated: corn, safflower, sunflower, soybean oil Monounsaturated: * best type of fat - olive oil, canola oil
- Essential fatty acids (EFA). Essential fatty acids are required for proper growth and healthy skin. EFAs, which are unsaturated fats, cannot be synthesized by the body and must be supplied by the diet. Some EFAs include corn oil, flax or linseed oil, and fish oils.
- Fat substitutes. Fat substitutes mimic the taste and feel of fat in the mouth. Food products with fat substitutes may help one lower his or her total fat and caloric intake. However, these foods should be consumed in moderation and should not take the place of more nutrient- and fiber-rich foods such as fruits, vegetables and grains.
- Cholesterol. Cholesterol is a waxy, fat-like substance essential and unique to all animal life. The body can use body fat to produce sufficient cholesterol; it does not need to obtain cholesterol through the diet. When too much saturated fat is consumed, the body produces excess cholesterol which can put individuals at risk for cardiovascular disease.

Tips To Decrease Fat In Your Diet

- Eat lean meats: turkey, chicken, fish
- Remove the skin from chicken, trim fat off meats, and eat water-packed tuna
- Choose low-fat dairy products, skim or 1% milk, low-fat cheese
- Eat baked, broiled, roasted, or steamed, foods (NOT fried)
- Use sauces, gravies, and salad dressing sparingly
- Choose tomato-based sauces for pasta instead of cream or cheese-based sauces

Vitamins. Vitamins are organic compounds essential for regulating most body functions. Vitamins cannot be manufactured by the body; they must be ingested through diet. It is important for you to consider vitamins as an important part of their diet. As your metabolism increases, so too must your intake of vitamins. The body cannot manufacture vitamins but requires them in small amounts. The *fat-soluble* vitamins A, D, E, and K are stored in the fat (adipose) tissues of the body. *Water-soluble* vitamins are not stored in the body, so it is important to consume adequate amounts daily. Water-soluble vitamins include the B-complex vitamins and vitamin C. Taking too many vitamins may pose serious health hazards and can be expensive. Megadoses of fat-soluble vitamins can lead to potential liver and kidney damage. Vitamin supplements should not be used to make up for poor dietary habits. A daily multi-vitamin and mineral supplement may used to insure the RDA is met.

Minerals. Minerals are inorganic elements. Their main functions are to produce and strengthen blood, bones and teeth and to aid in the normal functioning of muscles and nerves.

Minerals are also vital to the body's functioning. Over fifteen minerals have been identified but dietary allowances have been established for only six (calcium, phosphorous, magnesium, iron, zinc, and iodine). The major minerals include phosphorous, calcium, potassium, magnesium, sulfur, sodium and chloride. The trace minerals are iron, iodine, copper, zinc, fluorine, selenium, manganese, molybdenum and chromium. All minerals are important to the body because they work together to perform essential functions in the body.

Vitamins/Minerals of Special Concern to Athletes:

- B Complex: whole grain bread, pasta, tortillas, legumes, milk, peanut butter, poultry, fish
- Calcium: milk, yogurt, cheese, cottage cheese, spinach, dried peas and beans
- Iron: meat, fish, poultry, raisins, dried fruit, foods with 'enriched' or whole grain flour
- Zinc: fish, meat, whole grains, asparagus, nuts, eggs, milk, wheat germ
- Magnesium: milk, yogurt, nuts, fruits, leafy green vegetables, spinach, pecans

*It is important to eat a wide variety of foods to obtain all the essential vitamins/minerals.

Water. The most basic, vital nutrient of all - water is essential for all living things. As a part of blood, fluids help carry oxygen and nutrients to your working muscles. Remember: muscles are 70% water. It is the way by which all body processes take place, acting as a lubricant between cells and regulating body temperature by the evaporation of perspiration from the skin. Water is a major component of the body's cooling system and must be consumed in large quantities one to two hours before exercise in order to allow time for hydration and urination. Two cups of water should be consumed per pound lost during a session of physical readiness training. If an individual is dehydrated, his or her urine will be darker yellow and will have a stronger odor than usual. Certain vitamins and mineral supplements may also change the color of one's urine.

- Drink a minimum of 8- 8 oz glasses (64 oz) of water/day
- Don't wait until you are thirsty to drink water. By that time, you may have already lost 2 or more cups of your total body water.

Alcohol & Athletic Performance

- Alcohol is a poor source of fluids- it leads to dehydration.
- Depletes the liver's glycogen stores & impairs its capacity to form new glucose
- 3 or more drinks in one day will increase risk of high blood pressure, high lipids
- What Counts As 1 Drink?? 12 oz beer, 4 oz wine, 1.25 oz of hard liquor

Nutrition facts. Knowledge is the first step in developing proper nutritional lifestyles. Food labels may provide some useful information to guide individuals in more nutritious food selections. The new food label is called "Nutrition Facts." It provides information on the major nutrients.

The daily value (DV). A new label reference value, the Daily Value, was created to help consumers see how foods may be part of a daily nutritional plan.

Fat percentages. To calculate the percentage of fat calories in one serving, divide the value for Calories from fat by the total Calories and multiply by 100. For example if one serving contains 70 Calories from fat and the total number of Calories is 120, the food contains 58 percent fat Calories (70/120 X 100 = 58 percent).

Other carbohydrates. As listed on nutrition labels, sugars include both natural and added sugars. Dietary fiber is total dietary fiber, but may be listed as soluble and insoluble. Other carbohydrates represent total carbohydrates minus sugars and dietary fiber.

Healthy Weight Management

It is essential to the day-to-day effectiveness and combat readiness of the Marine Corps that every Marine maintain the established standards of health, fitness, and appearance. The habits of self-discipline required to gain and maintain a healthy body must be part of the character of every Marine. Weight MANAGEMENT programs can provide you with the tools you need to gain lean body mass, maintain body composition, or lose body fat, and ultimately physically prepare them for combat.

Body weight. The scale measures total body weight and does not differentiate between lean body mass (muscle, bone, organs, etc.) and fat mass. Lean Body Mass (LBM) is what a body weighs minus body fat. You may increase lean body mass and lose fat, but remains at the same body weight, a good weight gain. Many individuals mistakenly believe that all a person needs to do to lose weight is eat less.

Percent body fat. Those who are 'overweight' should be tested to determine their percent body fat. When evaluating someone for weight management, leaders must consider that everyone is different. Individuals should be educated about healthy nutritional lifestyles, how to physically train to lose fat and keep or build LBM, and how to modify their eating behavior. Male Marines must maintain a body fat of 18 percent or below to avoid being placed on weight control; female Marines' body fat must remain 26 percent or below.

The low calorie diet. A low calorie diet virtually guarantees an additional weight gain in the future. When individuals starve themselves to make weight, they lose a little fat, a lot of LBM, and slow their metabolism. The body has adjusted to maintain its slowed metabolism on fewer calories. When you return to your eating habits, the body stores the excess calories as fat. Additionally, since you now have less muscle mass, even fewer calories will be used than were burned PRIOR to dieting. The same individual will try to cut calories again to make weight. The body will adjust again by slowing its metabolism. The result is a vicious cycle; this is the reason some individuals are on and off weight control programs. You must be thoroughly educated and counseled on weight management to begin lifestyle changes, not quick fixes.

A comprehensive weight management program. Weight control problems are not easily remedied by simple advice to "eat less and PT more." A comprehensive weight management program (gaining LBM, maintaining body weight, losing body fat) involves a balanced nutritional lifestyle, a physical training program, and appropriate behavior changes.

Proper nutrition. Adequate nutrition and appropriate caloric intake are solid goals for weight management: ENERGY BALANCE = ENERGY IN MINUS ENERGY OUT. If you desire to INCREASE lean body mass (LBM), you need to have a positive energy balance. To maintain body weight, adequate nutrition and appropriate calories must be balanced with energy expenditure. To lose body fat a you need a NEGATIVE energy balance. Individuals can monitor their caloric intake by counting calories or using the exchange plan. Using the latter, individuals are instructed to eat a specific number of "exchanges" within food groups. Exchanges represent amounts of different foods within a group that are equivalent in nutrition and calories, i.e., fat exchange, carbohydrate exchange, etc.

Physical training. Physical training is critical to a weight management program, benefiting both the body and the mind. Individuals may increase their energy expenditure considerably while experiencing improvements in mood, energy levels, physical appearance, and self-esteem.

Behavioral changes. To succeed in a weight management program, individuals must identify and modify the behaviors that cause the problem. Behavioral changes include learning the relationship between hunger and appetite and how to make healthier, nutritional choices. Exercise may have an effect on curbing appetite on a short-term basis.

Gaining lean body mass. A weekly increase of one pound is a sound approach for gaining primarily muscle and not fat. To effectively increase LBM, one needs adequate rest and sleep, an appropriate increase in calories, and a proper resistance-training program.

Nutritional guidance. The Food Exchange System can be used as the basis for increasing calories to gain lean body weight. Increased calories should be in the form of three balanced meals plus several high-calorie, high-nutrient snacks, ensuring adequate protein for muscle growth.

Physical training guidance. One underlying principle of resistance-training programs is the "overload principle", which simply means the muscles should be stressed beyond normal daily levels. Progressive resistance is another basic principle. This means that as an individual gains strength through the overload principle, he or she must progressively increase the resistance. You should incorporate aerobic exercise with resistance training to develop endurance and stamina.

FITT Principle for LBM gain. The frequency, intensity, time, and type of exercise () all contribute to the conditioning effect you will get from an exercise program. The following chart applies in developing LBM. To increase LBM, one should exercise near the strength continuum performing fewer repetitions with greater resistance. One should begin with a weight he or she you can lift for 5 repetitions, and progressively increase the repetitions to 10. After reaching 10 repetitions, the individual should increase the resistance (weight) until he or she can only perform 5 repetitions. Then, the cycle is repeated.

FITT Component	
Type	Resistance Training supplemented with aerobic endurance training.
Frequency	3-5 days per week.
Time	3-5 sets per exercise.
Intensity	5-10 repetitions per set.

Losing body fat. The recommended fat loss is one to two pounds of body fat per week. This can be done by combining a low-calorie lifestyle with physical training. Fat-reduction training programs must involve large muscle groups for extended periods of time, i.e., aerobic endurance exercise. Resistance training is also needed to maintain LBM while burning fat. Moreover, identifying when you are physiologically hungry (hunger) or psychologically hungry (appetite) will help you develop sound nutritional lifestyles.

Nutritional guidance. You can use the food exchange system to select low-calorie foods, thus making more nutritional choices in the chow hall. Individuals should become educated in nutrition and be aware of the hidden fats and empty calories in certain (many processed) foods. The intent is for Marines to make healthy nutritional choices without being forced and constantly controlled.

Physical training guidance. To burn fat, training sessions must involve aerobic endurance exercises. The following mobilizes fat for use as an energy source.

FITT Principle for burning fat:

FITT Component	
Type	Aerobic exercise, (running, cycling, hiking, swimming, etc.).
Frequency	3-5 days per week.
Time	20- 50 minutes.
Intensity	60 percent to 70 percent of your maximum heart rate.

A common misconception is that overweight Marines do not need to build muscle. Actually, increased muscle mass burns more fat. Strength training should consist of three nonconsecutive days per week. All major muscle groups should be exercised with three sets of 8-10 repetitions.

Tips For Weight Loss

One pound of fat = 3,500 calories

- To lose one pound/week you need to decrease your caloric intake by 500 calories/day by eating less and/or exercising more
- A safe and healthy weight loss is 1-2 pounds/week
- Eat small meals every 3-4 hours to prevent overeating and increase metabolism
- Cut down on portion sizes
- Drink water

Tips For Weight Gain

- Strength training builds lean body mass
- Eat energy dense, high calorie foods: milk, peanut butter, granola, oatmeal, pasta, rice, potatoes, dried fruit, nuts, and seeds
- Limit caffeine
- Quit tobacco use
- Get enough sleep

Nutritional Guidelines for Ultra-Performance. Regular training increases the muscles' ability to store and use carbohydrates for energy production. However, there are some short-term nutritional steps one can take before endurance events (such as a long conditioning march) to improve performance.

Carbohydrate loading. Two to three days before an endurance activity Marines should begin eating high carbohydrate meals that may include pasta, rice, potatoes, whole grain breads and cereals, etc., and prehydrate with water. Caffeine and alcohol intake should be curtailed, as these will dehydrate the body. The night before the event, one should have a smaller carbohydrate meal and hydrate with water. A light carbohydrate snack before retiring may also be consumed.

Pre-activity meal. In general, the pre-activity meal should allow for the stomach to be relatively empty at the start of the activity. It should help to prevent or minimize gastrointestinal distress and help the individual to avoid sensations of hunger, lightheadedness, or fatigue. This meal also provides adequate fuel (primarily carbohydrates) for the blood and muscles, and provides for an adequate amount of body water.

Carbohydrates. In general, a carbohydrate meal should be eaten about three to four hours prior to endurance activities. This allows the stomach to be relatively empty at the time of the event while minimizing hunger pangs. The meal should be high in complex carbohydrates, low in fat and protein, and easily digestible. Beans, spicy foods and bulk foods like bran products should be avoided. High-sugar foods can cause "insulin rebound" which results in a drop in blood glucose. Examples of pre-activity meals with substantial amounts of carbohydrate are presented in *Table 8-1*.

Fluids. Adequate fluid intake prior to activity is vital, particularly if the activity will be for a long duration or in a hot or humid environment. Again, caffeine and alcohol should be avoided. Individuals should also avoid large amounts of protein, as this increases water output of the kidneys. Taking in fluids up to 15 to 30 minutes prior to activities will help ensure adequate hydration.

- Thirst mechanism. A substantial level of dehydration can occur before one feels "thirsty". Therefore, fluid intake should be 8 to 12 ounces 15 minutes before the event, and 3 to 4 ounces every 10 to 15 minutes during the activity. Afterwards, one should take in 16 ounces of fluid for every pound of bodyweight lost.

- Prolonged activities. For endurance activities lasting less than 60 minutes, water should be the primary fluid replacement. After one hour of activity, sports drinks can be beneficial in restoring fluid levels.
- Fluid replacements. The best fluid replacement drink is one that tastes good, does not cause gastrointestinal distress, promotes rapid fluid absorption, and provides energy (8 ounces of sports drink should provide between 14 and 19 grams of carbohydrate, about 56 to 76 calories per serving).

General recommendations. Meals other than the pre-activity meal eaten on the same day should not be skipped. They should follow the basic principles discussed earlier.

- Morning Activities: Eat a pre-activity meal similar to breakfast; for example, Meal A in *Table 8-4*.
- Early to Mid-Afternoon Activities: Eat breakfast and lunch. Consume a more substantial breakfast, along with Meal B in *Table 8-4*.
- Late Afternoon Activities: Eat breakfast, lunch and a snack. Eat a substantial breakfast and lunch, and consume snacks that are appealing (such as fruit, bagels, or other easily digestible foods.)
- Evening Activities: Eat breakfast, lunch and a preactivity meal for dinner.
- Liquid meals. Liquid meals have some advantages over solid meals for pre-activity nutrition; they have a high carbohydrate content, have no bulk, are easily digested and assimilated, and may be more practical than a solid meal. Most liquid meals are high in carbohydrates, low in protein and fat, and may have added vitamins and minerals. The following formula will provide one quart of liquid meal:
  1/2 cup water.
  1/2 cup nonfat dry milk powder.
  1/4 cup of a glucose polymer (available at running and health stores).
  3 cups of skim milk.
  1 teaspoon of flavoring for taste (cherry, vanilla or chocolate extract).
- Liquid meal substitutes. Liquid meals should be used primarily as a substitute for pre-activity nutrition. They *should not* be used on a long-term basis to replace a balanced nutritional lifestyle.

Eating during activities. There is no need to consume anything during most types of endurance activities except possibly carbohydrates and water. Carbohydrates taken during these activities may help delay the onset of fatigue, while water is critical to regulate body temperature.

Eating after activities. Carbohydrates and fat are the main nutrients used during exercise and can be replaced easily from foods. For those individuals performing daily physical endurance events, their post-activity meal should stress complex carbohydrate foods. This will help replenish the muscle stores of glucose (glycogen) necessary for continued daily training at high intensity.

Eating on the "run". The following are nutritional choices of high-carbohydrate and low-fat foods that can easily be bought, prepared, or packed.

- Breakfast

English muffins, unbuttered, with jelly.
Whole wheat pancakes with syrup.
French toast.
Bran muffins, fat-free or low-fat.
High-fiber cereal.
Hot whole grain cereal, oatmeal.
Skim or low-fat milk.
Orange juice.

- Lunch or Dinner

Low-fat sandwiches, no mayonnaise or high-fat sauces.
Grilled chicken breast sandwich on whole grain bun.
Baked or broiled fish sandwich.
Lean roast beef sandwich, on a whole grain bun.
Single, plain hamburger on a whole grain bun.
Baked potato, with toppings on the side (add sparingly).
Pasta dishes, spaghetti and macaroni, with low-fat sauces.
Rice dishes.
Lo mein noodles, not chow mein (fried noodles).
Soups, rice and noodle.
Salsas, made with tomatoes.
Chicken or seafood tostadas, made with cornmeal tortilla.
Bean and rice dishes.
All whole grain and other breads.
Salads, low-fat dressings.
Salad bar, focus on vegetables and high-carbohydrate foods; avoid high-fat items.
Pizza, thick crust, vegetable type with minimum cheese topping.
Skim or low-fat milk.
Orange juice.
Frozen yogurt, fat-free or low-fat.
Sherbet.

- Snacks. See *Table 8-5* for easily packed snacks.

Nutrition, Performance and Weight Management TABLES

Table 8-1: Foods high in carbohydrate content

Grains/Cereal Exchange	**Fruit Exchange**	**Vegetable Exchange**	**Milk Exchange**	**Meat Exchange**	**Sports Drinks/ Sports Bars**
Whole Grains -Brown Rice -Granola -Oatmeal -Cereals -Whole Grain Breads, Crackers, Pasta, Cereals Enriched Grains Bagels -Biscuits -Cornbread -English Muffins -Macaroni -Noodles -Pasta -Cereals* -White Bread, Rice	Apples Bananas Blueberries Cantaloupe Cherries Dried Fruits Oranges Peaches Pears Pineapple Plums Tangerines	Corn Peas Lima Beans Potatoes Sweet Potatoes Squash	Ice Milk Skim Milk Yogurt, fruit	Kidney Beans Navy Beans Split Peas Lentils Chestnuts	Exceed Gatorade Gatorlode Exceed Sports Bar Power Bar

Dietary carbohydrates: Of the six Food Exchanges, the vegetable, fruit, grains and cereal exchanges are the three primary contributors of carbohydrates to the diet. Some foods in the meat and milk groups contain moderate to high amounts of carbohydrates.

*Cereals may be whole wheat or enriched depending on the brand.

Williams, MH, Nutrition for Fitness and Sport, Brown & Benchmark, Chicago, IL, 4th, 1995, p.86.

Table 8-2: Vitamins

Vitamins	Main Function	Food Sources
A	Maintenance of skin, bone growth, vision and teeth.	Eggs, cheese, margarine, milk, carrots, broccoli, squash and spinach.
D	Bone growth and maintenance.	Milk, egg yolk, tuna and salmon.
E	Prevents oxidation of polyunsaturated fats.	Vegetable oils, whole-grain cereal, bread, dried beans, and green leafy vegetables.
K	Blood clotting.	Cabbage, green leafy vegetables, and milk.
Thiamin (B_1)	Energy-releasing reactions.	Pork, ham, oysters, breads, cereals, pasta, and green peas.
Riboflavin (B_2)	Energy-releasing reactions.	Milk, meat, cereals, pasta, and dark green vegetables.
Niacin	Energy-releasing reactions.	Poultry, meat, tuna, cereal, pasta, bread, nuts, and legumes.
Pyridoxine (B_6)	Metabolism of fats and proteins and formation of red blood cells.	Cereals, bread, spinach, avocados, green beans, and bananas.
Cobalamin (B_{12})	Formation of red blood cells and functioning of nervous system.	Meat, fish, eggs and milk.
Folacin	Assists in forming proteins and in formation of red blood cells.	Dark-green leafy vegetables, wheat germ.
Pantothenic Acid	Metabolism of proteins, carbohydrates, and fats, formation of hormones.	Bread, cereals, nuts, eggs, and dark green vegetables.
Biotin	Formation of fatty acids and energy-releasing reactions.	Egg yolk, leafy green vegetables.
C	Bones, teeth, blood vessels and collagen.	Citrus fruits, tomato, strawberries, melon, green pepper and potato.

Steen SN, Brownell KD, "Nutrition", in ACSM, Resource Manual for Guidelines for Exercise Testing and Prescription,

2nd ed., Lea & Feiberger, Philadelphia, PA, 1993:466-482.

Table 8-3: Minerals

Vitamins	Main Function	Food Sources
Calcium	Formation of bones, teeth, nerve impulses and blood clotting.	Cheese, sardines, dark green vegetables, clams, milk.
Phosphorous	Formation of bones and teeth, acid-base balance.	Milk, cheese, meat, fish, poultry, nuts and grains.
Magnesium	Activation of enzymes and protein synthesis.	Nuts, meats, milk, whole-grain cereal, and green leafy vegetables.
Sodium	Acid-base balance, body water balance, and nerve function.	Most foods except fruit.
Potassium	Acid-base balance reactions, body water balance, and nerve function.	Meat, milk, many fruits, cereals, vegetables, and legumes.
Chloride	Gastric juice formation and acid-base balance.	Table salt, seafood, milk, meat, and eggs.
Sulfur	Component of tissue, cartilage.	Protein foods.
Iron	Component of hemoglobin and enzymes.	Meats, legumes, eggs, grains, and dark-green, vegetables.
Zinc	Component of enzymes, digestion.	Milk, shellfish and wheat bran.
Iodine	Component of thyroid hormone.	Fish, dairy products, vegetables and iodized salt.
Copper	Component of enzymes, digestion.	Shellfish, grains, cherries, legumes, poultry, oysters, and nuts.
Manganese	Component of enzymes, fat synthesis.	Greens, blueberries, grains, legumes, and fruit.
Fluoride	Maintenance of bones and teeth.	Water, seafood, rice, soybeans, spinach, onions and lettuce.
Chromium	Glucose and energy metabolism.	Fats, meats, clams and cereals.
Selenium	Functions with Vitamin E anti-oxidant.	Fish, poultry, meats, grains, mil, and vegetables.
Molybdenum	Component of enzymes.	Legumes, cereals, dark-green leafy vegetables.

Steen SN, Brownell KD, "Nutrition", in ACSM, Resource Manual for Guidelines for Exercise Testing and Prescription,

2 nd ed., Lea & Feiberger, Philadelphia, PA, 1993:466-482.

Table 8-4: Examples of Pre-activity meals

Meal A	Meal B
Glass of orange juice.	One cup low-fat yogurt.
Bowl of oatmeal.	One banana.
Two slices of toast with jelly.	One toasted bagel.
Sliced peaches with skim milk.	One ounce turkey breast.
	One-half cup of raisins.

Williams, MH, Nutrition for Fitness and Sport, Brown & Benchmark, Chicago, Ill 4th, 995, p. 86.

Each meal contains about 500-600 Calories.

Table 8-5: Easily Packed Snacks for Humps, or Brown Bag Lunches

Bread/Cereal Exchange	Meat Exchange	Vegetable Exchange
Bagels	Small can of baked beans	Sliced carrots
Pita Bread	Cooked chicken or turkey, small 2	Broccoli stalks
Muffins	oz commercial packages, packed	Cauliflower pieces
Fig Newtons	in airtight plastic bags.	Tomatoes
Vanilla Wafers	Small can of sardines	Canned vegetable
Whole Wheat Crackers	Peanut butter	juices
Graham Crackers	Reduced-fat cheese slices	
Certain Dry Cereals	Nuts	
Wheat Chex		
Grapenuts		
Plain Popcorn		
Fruit Exchange	**Milk Exchange**	
Small cans of fruit in own juice	Small containers of skim or low-fat milk.	
Small containers of fruit juice	Dried skim milk powder to be reconstituted.	
Oranges	Packaged yogurt.	
Apples		
Other raw fruits		
Dried fruits		

Williams, MH, Nutrition for Fitness and Sport, Brown & Benchmark, Chicago, IL, 4th, 1995, p. 8

Appendices

Appendix A

Minimum Physical and Fitness Training Requirements

"Self-confidence is the first requisite to great undertakings."

- Samuel Johnson: Lives of the Poets (Pope), 1779

MASL	COURSE DESCRIPTION	PREREQUISITES
P121008	Infantry Officer Course USMC	Score of 225 or better on the Marine Corps PFT
P121017	Combat Engr NCO Course	Score of 225 or better on the Marine Corps PFT
P121018	Basic Combat Engineer	Score of 225 or better on the Marine Corps PFT
P121029	Summer Mountain Leaders Course	Score of 250 or better on the Marine Corps PFT
P121030	Winter Mountain Leaders Course	Score of 250 or better on the Marine Corps PFT
P121034 P121035	Infantry Squad Leader	Score of 225 or better on the Marine Corps PFT
P121036 P121037	Infantry Platoon Sergeant	Score of 225 or better on the Marine Corps PFT
P121802	Combat Engr Officer USMC	Score of 225 or better on the Marine Corps PFT
P121834	Cold Weather Survival Course	Score of 250 or better on the Marine Corps PFT
P121855	Light Armored Veh OFF/SNCO	Score of 225 or better on the Marine Corps PFT
P124111	Basic Scout Swimmer Course	WSA class qualification on the Water Survival Qualification Program
P124300	Basic Reconnaissance Course	Score of 225 on the Marine Corps PFT and WSA class qualification on the Water Survival Qualification Program
P124801	Assault Amphibian Unit Leader	Qualify as a WSI class swimmer
P124851	Combatant Divers Course	Score of 225 on the Marine Corps PFT and WSA class qualification on the Water Survival Qualification Program
P144002	Assault Amphibious Veh Crmn	Qualify as a WSI class swimmer
P144802	Assault Amphibian Veh Off	Qualify as a WSI class swimmer
P144803	Assault Amphib Repairman Bas	Qualify as a WSI class swimmer
P144804	Light Armored Veh Repairer	Qualify as a WSB class swimmer
P144805	Light Armored Veh Technician	Qualify as a WSB class swimmer

MASL	COURSE DESCRIPTION	PREREQUISITES
P166009	Martial Arts Instructor Training Course	Score of 225 or better on the Marine Corps PFT; Qualify as a WSB class swimmer
P166801 P166802	Drill Instructor USMC	Score of 225 or better on the Marine Corps PFT
P166810	Non-Lethal Individual Weapons Instructor	Score of 225 or better on the Marine Corps PFT
P171207	SNCO Career Course USMC	Score of 225 or better on the Marine Corps PFT
P171809	Sergeants Course	Score of 225 or better on the Marine Corps PFT
P171812	Staff NCO Academy Advanced Course	Score of 225 or better on the Marine Corps PFT
P175228	Cold Weather Medicine	Score of 225 or better on the Marine Corps PFT
P175235	Wilderness Medicine Course	Score of 225 or better on the Marine Corps PFT
P179250	Basic Officer Course USMC	Score of 225 or better on the Marine Corps PFT

Appendix B

CIRCUIT COURSE TRAINING AND THE HIGH INTENSITY TACTICAL TRAINING (HITT) PROGRAM

"To insure victory the troops must have confidence in themselves as well as in their commanders."
- Niccolo Machiavelli: Discorsi, xxxiii, 1531

Circuit Course Training and the High Intensity Tactical Training Program are meant to be enhancements to the training programs currently being implemented at your installations.

Benefits of Circuit Course Training

Definition. A circuit course is a group of stations or areas where specific tasks or exercises are performed. The benefit of circuit course training is that it promotes fitness in all areas of the body. Circuits are designed to provide exercise to groups of Marines at intensities, which suit each person's fitness level.

Objective. The objective of the circuit course and the time and equipment available strongly influence the number of stations. A circuit course geared for a limited objective (for example, developing upper body strength) needs as few as six to eight stations. On the other hand, circuits to develop both strength and cardio-vascular fitness may have as many as 20 stations. The stations are only limited by the unit leader's imagination and resources. (Refer to figure B-1 for sample circuit course.)

Types of Courses. There are two different types of circuit courses. The Daily 16 Conditioning Exercises are good examples of exercises that may be conducted on a circuit course.

- Free Circuit. In a free circuit, there is no set time for staying at each station and no signal is given to move from one station to the next. Individuals work at their own pace, doing a fixed number of repetitions at each station. Progress is measured by the time needed to complete a circuit. Because Individuals may do incomplete or fewer repetitions than called for to reduce this time, the quality and number of repetitions should be monitored.
- Fixed Circuit. In a fixed circuit, a specific length of time is set for each station. The time is monitored with a stopwatch and Individuals rotate through the stations on command (i.e. a whistle).

SAMPLE CIRCUIT COURSE

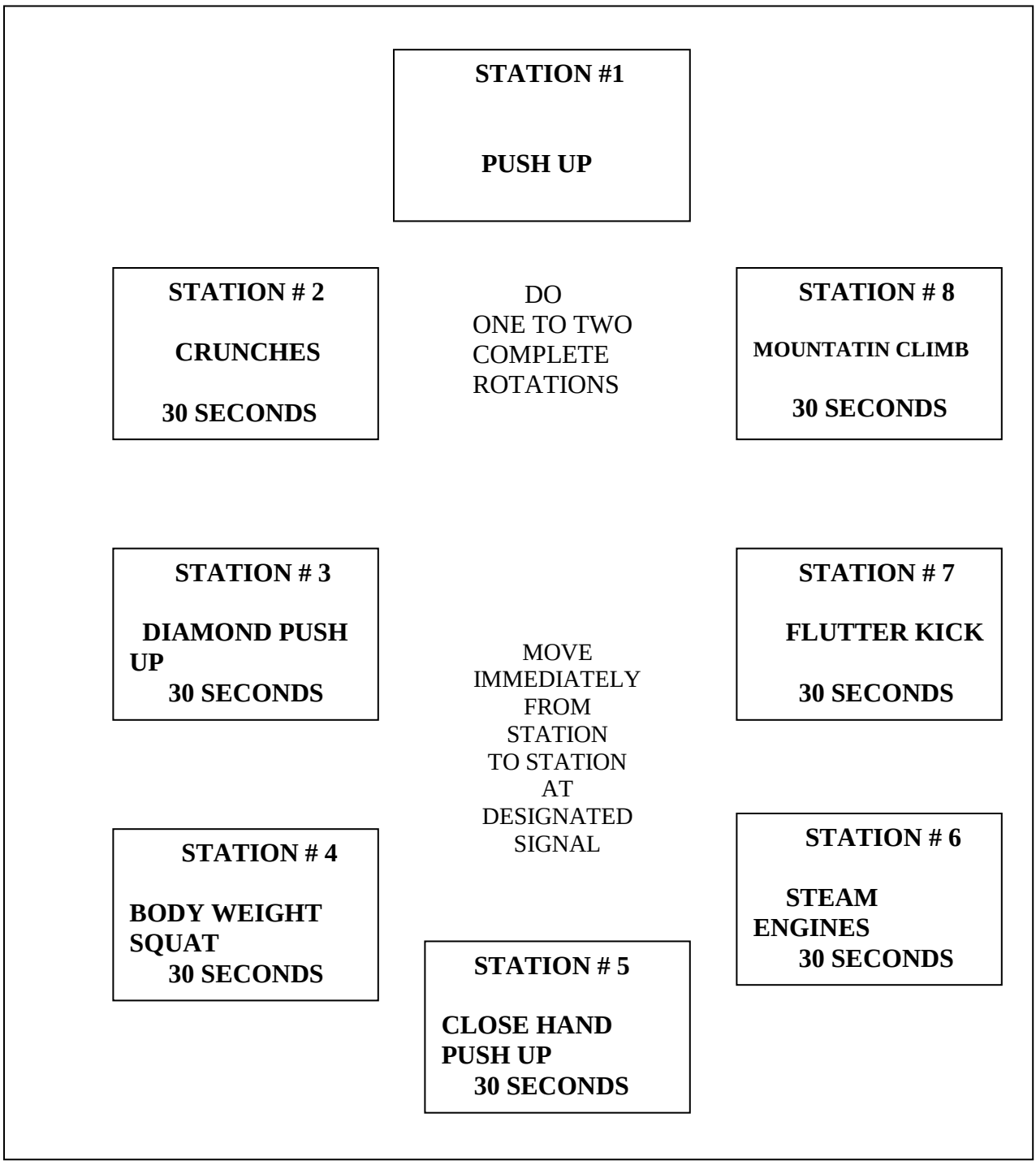


Figure B-1

5 Week Circuits

EXERCISE	CIRCUIT 1	CIRCUIT 2	CIRCUIT 3	WEEK
TRICEP DIPS	15 SECS	20 SECS	25 SECS	1 - 2
1/2 SIT-UPS	15 SECS	20 SECS	25 SECS	"
MOUNTAIN CLIMBERS	15 SECS	20 SECS	25 SECS	"
DIAMOND PUSH-UPS	15 SECS	20 SECS	25 SECS	"
CRUNCHES	15 SECS	20 SECS	25 SECS	"
BENDS & THRUST	15 SECS	20 SECS	25 SECS	"
WIDE PUSH-UPS	15 SECS	20 SECS	25 SECS	"
SIT-UPS	15 SECS	20 SECS	25 SECS	"
SQUATS	15 SECS	20 SECS	25 SECS	"
PUSH-UPS	15 SECS	20 SECS	25 SECS	"

Rest Period of 1.5 minutes between circuits then begin again. After two weeks, increase the time as follows:

CIRCUIT 1	CIRCUIT 2	CIRCUIT 3	WEEK
20 SECS	25 SECS	30 SECS	3-4
30 SECS	35 SECS	40 SECS	5

Notes on circuits:
1. Be sure to warm-up properly prior to exercising.
2. Use proper form and technique.
3. Complete as many correct exercises as you can.
4. Move to the next exercise without rest.
5. Work through all the exercises in correct sequence.
6. Cool down and Stretch after completion.

The circuit is continuous work, do not stop between exercises. Try to complete level one the first time you work the circuit. When you master this level move to level two. Your goal is to complete level three before reporting to training. Ensure that all exercises are done correctly. Your Security Assistance Officer can demonstrate any exercises not familiar to you or can find assistance in demonstrating these exercises.

Begin as many weeks out as you wish, but you should start a minimum of 5 weeks before reporting to training. Your training should be maintained while you are in language training at DLIELC. Work back 5 weeks from the day you are to report to training. If you are to report in less than 5 weeks, let your Security Assistance Officer know.

It is recommended that you familiarize yourself by running in combat boots. In order to avoid injury, you should allow your boots a short break-in period and your training adjusted to allow you time to transition safely.

WEEK	MON	TUE	WED	THU	FRI	SAT	SUN
1	REST	2 MILES	REST	1.5 MI Boots	REST	X TRN	3 MILES
2	REST	2 MI	REST	1.5 MI Boots	REST	X TRN	3 MI
3	REST	2 MI	REST	1.5 MI Boots	REST	X TRN	4 MI
4	REST	3 MI	REST	2 MI Boots	REST	X TRN	4 MI
5	REST	3 MI	3 MI	2 MI Boots	REST	X TRN	5 MI

FIVE WEEK TRAINING PROGRAM (MALE)

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
MON				
2 MI RUN	2.5 MI RUN	3 MI RUN	4 MI RUN	5 MI RUN
8.5 MIN/ MI	8.5 MIN/MI	8MIN/MI	8 MIN /MI	8 MIN / MI
TUE				
CIRCUIT	CIRCUIT	CIRCUIT	CIRCUIT	CIRCUIT
LEVEL1(L1)	L1 X 2	L2	L2 X 2	L3

WED				
1.5 MI RUN	1.5 MI RUN	2.0 MI RUN	2.5 MI RUN	3.0 MI RUN
BOOTS	BOOTS	BOOTS	BOOTS	BOOTS
THU				
REST	REST	REST	REST	REST
FRI				
CIRCUIT	CIRCUIT	CIRCUIT	CIRCUIT	CIRCUIT
L 1	L 1 X 2	L 2	L 2 X 2	L 3
SAT				
REST	1.5 MI RUN	2 MI RUN	2.5 MI RUN	3 MI RUN
	ALL OUT*	ALL OUT*	ALL OUT*	ALL OUT*
SUN				
REST	REST	REST	REST	REST

* Precede Run with maximum sit-ups and pull-ups.

CIRCUITS (MALE)

EXERCISES	LEVEL ONE	LEVEL TWO	LEVEL THREE
	A B C	A B C	A B C
PULL-UPS	3 3 3	5 5 5	8 8 8
SIT-UPS	20 20 20	30 30 30	40 40 40
PUSH-UPS	10 10 15	20 20 20	20 30 30
STEP-UPS	50 50 50	50 50 60	60 60 70
TRICEP DIPS	20 15 20	30 20 20	40 30 30
BENDS & THRUST	10 10 10	20 15 10	20 20 20

FIVE WEEK TRAINING PROGRAM (FEMALE)

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
MON				
1 MI RUN	1.5 MI RUN	2 MI RUN	2.5 MI RUN	3 MI RUN
9.5 MIN/ MI	9.5 MIN/ MI	9.5 MIN/ MI	9 MIN/ MI	9 MIN/ MI

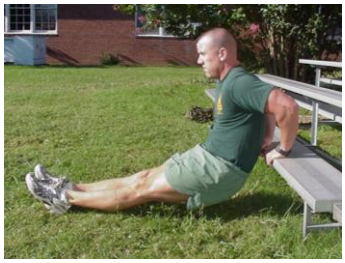
TUE				
CIRCUIT	CIRCUIT	CIRCUIT	CIRCUIT	CIRCUIT
LEVEL 1	L1 X 2	L2	L2 X 2	L3
WED				
1.5 MI RUN	1.5 MI RUN	2 MI RUN	2.5 MI RUN	2.5 MI RUN
TENNIS SHOES	BOOTS	BOOTS	BOOTS	BOOTS
THURS				
REST	REST	REST	REST	REST
FRI				
CIRCUIT	CIRCUIT	CIRCUIT	CIRCUIT	CIRCUIT
LEVEL 1	L1 X 2	L2	L2 X 2	L3
SAT				
REST	1.5 MI RUN	2 MI RUN	2 MI RUN	3 MI RUN
SUN				
REST	REST	REST	REST	REST

CIRCUITS (FEMALE)

EXERCISES	LEVEL ONE	LEVEL TWO	LEVEL THREE
	A B C	A B C	A B C
FLEXED ARM HANG (Seconds)	20 20 20	25 25 25	30 30 30
SIT-UPS	15 15 15	20 20 20	25 25 25
PUSH-UPS	5 5 5	10 10 10	25 25 25
STEP-UPS	30 30 30	40 40 40	50 50 50
TRICEP DIPS	10 10 10	15 15 15	20 20 20
BENDS & THRUSTS	10 10 10	12 12 12	15 15 15

OTHER EXERCISES FOR CIRCUIT TRAINING

(1) Tricep Dips. Using a bench or chair, put hands on the edge with feet pointing up and legs straight out in front. Bending the elbows, lower body. Return to starting position and repeat.

(2) Diamond Pushups. The starting position is with your hands directly under your chest, head and neck are straight, legs are straight, and your feet are spread to help maintain balance. It's important that you keep your head up and your torso rigid while doing these. If you allow your core to relax and your head to drop, your abs will sway down towards the ground and over time that can lead to pain in your lower back. Try to imagine that you are lying on a plank of wood and that should keep everything from your shoulders to your heels in a straight line.

To execute the pushup, simply tuck your elbows back towards your hips. At the bottom position, the insides of your biceps should be touching your ribcage and your triceps should be just below parallel. The bottom position is a good time to check the placement of your hands to make sure there is no discomfort in the wrists.

The action of tucking your elbows in to your body extends the triceps range of motion (as opposed to a regular shoulder-width pushup) and this gives the feeling of "isolating the tri's". Try different hand spacing until you feel it in the right "spots".

From the position in the third picture, simply push the earth away from your chest and rise up to the Start Position. And continue the repetition.

This is the hand position for Diamond Pushups.

This is the starting position for Diamond Pushups.

HITT OVERVIEW

The High Intensity Tactical Training (HITT) program's primary purpose is to enhance operational fitness levels and optimize combat readiness and resiliency for the United States Marine. While not directive in nature, HITT supports Commanders in their duties to optimize the combat readiness of their Marines. It complements other physical training Commanders/individual Marines utilize to obtain and maintain physical fitness. This comprehensive strength and conditioning program takes into consideration the physical demands of operational related activities in order to optimize physical performance while in combat. By implementing the latest cutting edge training methods and fundamental scientific principles, the HITT program focuses on enhancing athleticism for today's tactical athlete - The United States Marine. Emphasis of the HITT program is on key components with relation to superior speed, power, strength endurance and overall combat readiness while reducing the likelihood of injury and ensuring that all Marines are physically prepared for combat.

WORKOUT MODULES

This program is based on three modules of scalable physical conditioning. Each of the HITT modules: Athlete HITT, Combat HITT, and Warrior HITT contains 25 pre-designed work-outs with escalating level of physical demand and conditioning difficulties:

-Athlete HITT develops basic strength and linear speed utilizing barbells, kettlebells, dumbbells, speed harnesses, resistance trainers and sleds.
-Combat HITT develops functional strength and endurance utilizing suspension trainers, ammo cans, partner drills and incline endurance training.
-Warrior HITT develops explosive power and agility utilizing Olympic lifts (OL), plyometrics, battle ropes, cones, hurdles and ladders.

TRAINING AND COMBAT PERFORMANCE FOCUS

The 4 major components of the HITT combat performance enhancement program include Active Dynamic Warm-Up, Strength and Power, Speed and Agility, and Flexibility and Core Stability. The HITT workout program can be customized and used by leaders or individual Marines as a training tool to plan and execute personal or unit's fitness training program, including pre-deployment, deployment, and post deployment. Users can integrate the ability to view videos that provide the proper execution of all exercises and movements in the program. The exercise videos are organized in the same three HITT categories and four areas of focus. These videos can be accessed through Exercises Video links.

Chapter 2 PHYSICAL READINESS GUIDE

There are many components which work to optimize a Marine's physical readiness. Included among these are; physical fitness, diet and nutrition, injury prevention, and fatigue management. The recommended balanced approach requires consideration of all four aspects of physical readiness for optimum performance gains and combat conditioning.

The High Intensity Tactical Training (HITT) Program advocated in this website is a comprehensive combat-specific strength and conditioning program that is essential to Marine's physical development, combat readiness, and resiliency. While not directive in nature, HITT supports Commanders in their duties to optimize the combat readiness of their Marines. It complements other physical training Commanders/individual Marines utilize to obtain and maintain physical fitness. This scalable program is designed on three levels of escalating conditioning difficulty. The program can be used by individual Marines or as a unit training tool to plan and execute unit's fitness training program for pre-deployment, deployment, and post deployment. A collection of short work-out videos is also provided as a companion source for demonstration purposes.

Active Dynamic Warm-Up

To minimize the risk of injury and maximize the training effect, all workouts should begin with a period of warm-up. A proper warm-up includes gradual movements and allows the muscular and neuromuscular system opportunity to reach training intensity without underworking or over-fatiguing muscles. Warm-ups increase the blood flow to the muscles and increase the body temperature. Warm-ups also stimulate the nervous system and increase mobility of the joints ad as a result reducing the risk of training injuries.

Arm Circles:

Conduct 10 arm circles to the front and 10 arm circles to the rear, repeat exercise 3 times.

Bear Crawl:

With both hands and feet on the deck, crawl 25 meters turn around crawl 25 meters, repeat exercise 3 times.

High Knees:

With your hands parallel to the deck, alternate each knee up to same side hand 10 times, repeat exercise 3 times.

Air Squats:

With your feet shoulder width apart go from a standing position to a sitting position, once your legs become parallel with the deck come back to a standing position. Ensure that your back remains straight and that your head is looking forward for entire exercise. Conduct a total of 30 Air Squats.

Core Stability & Flexibility

The core supports the spine and all movement of the body which includes the trunk. Core stability training targets muscles deep inside the abdomen which connect to the spine, pelvis, and shoulders. Core supports body movements that take place along three planes, in the forward and backward movements such as bicep curls, sit-ups, and back extensions; and in side-to-side movements such as side bends or lateral raises. The core also supports movements that require rotation including movements such as floor to overhead diagonals with the arms holding a medicine ball. Physical performance is enhanced when a safe and effective flexibility training program is a part of the Marines' workout. A flexible joint can move through greater range of motion and reduces the risk of injury. Static stretching movements have also been proven to help reduce muscle soreness after exercise.

Cross Body Trunk Twist:
In sitting position, cross one foot over opposite knee, place same side hand behind hip and cross opposite arm on raised leg. Continue to hold stretching position for a count of 10. Repeat for opposite side.

Toe Touches:

While laying flat on your back, raise both legs until bottom of feet are facing the ceiling, reach up with arms fully extended and attempt to touch your toes. Hold the stretch for a count of 10.

Hanging Flutter Kicks:
While hanging from a Pull-Up Bar, place your legs straight in front of you and complete 20 alternating flutter kicks.

Speed, Agility & Endurance

Examples of exercises that improve speed and agility include sprints, plyometrics, lower body weight lifting and strengths exercises. Progressive speed training has been shown to increase agility as well as jump height, jump power, jump length, squat strength, and sprint speed. Endurance training leads to increased strength and improved stamina. Marines can enhance their endurance though training such as long-distance running, swimming, foot marching, cycling, and low-weight and high-repetition strength training.

Zig-Zag Drill:
Place a series of alternating cones on the field and sprint to the outside of each cone, zig-zagging from side-to-side. Do not cross your feet over each other and keep your body facing forward for the entire exercise. Repeat exercise 3 times.

Stair Sprints:

Sprint up a flight of stairs, 30 steps or more, and jog back down. Do not skip steps on the way up. Repeat exercise 10 times.

Hill Sprints:

Sprint up a steep hill and jog back down. Repeat exercise 10 times.

Strength & Power

The HITT Program strength and power training serves to increase explosive power, functional strength and muscular endurance for Marines. Employing a periodized, progressive strength training routine is an effective approach which helps Marines develop maximal strength and endurance gains. Olympic lift exercises like the clean and jerk, snatch, and dead lift support training for explosive power. These exercises enable muscles to reach maximum strength in short time. Power is also viewed as the product of strength and speed. Activities such as throwing, jumping, striking, and moving explosively from a starting position require power.

Back Squat:

With a Barbell and sufficient weight, conduct a full squat for 10 repetitions. Repeat exercise 3 times. Sufficient weight and proper form will prevent injuries.

Ammo Can Push-Presses:

An ammo can with 30 pounds of sand in it, handle facing out, grip on each side and press the ammo can from below the chin to overhead and return to below chin. Complete 50 to 100 repetitions.

Buddy Assisted Sit-Ups:

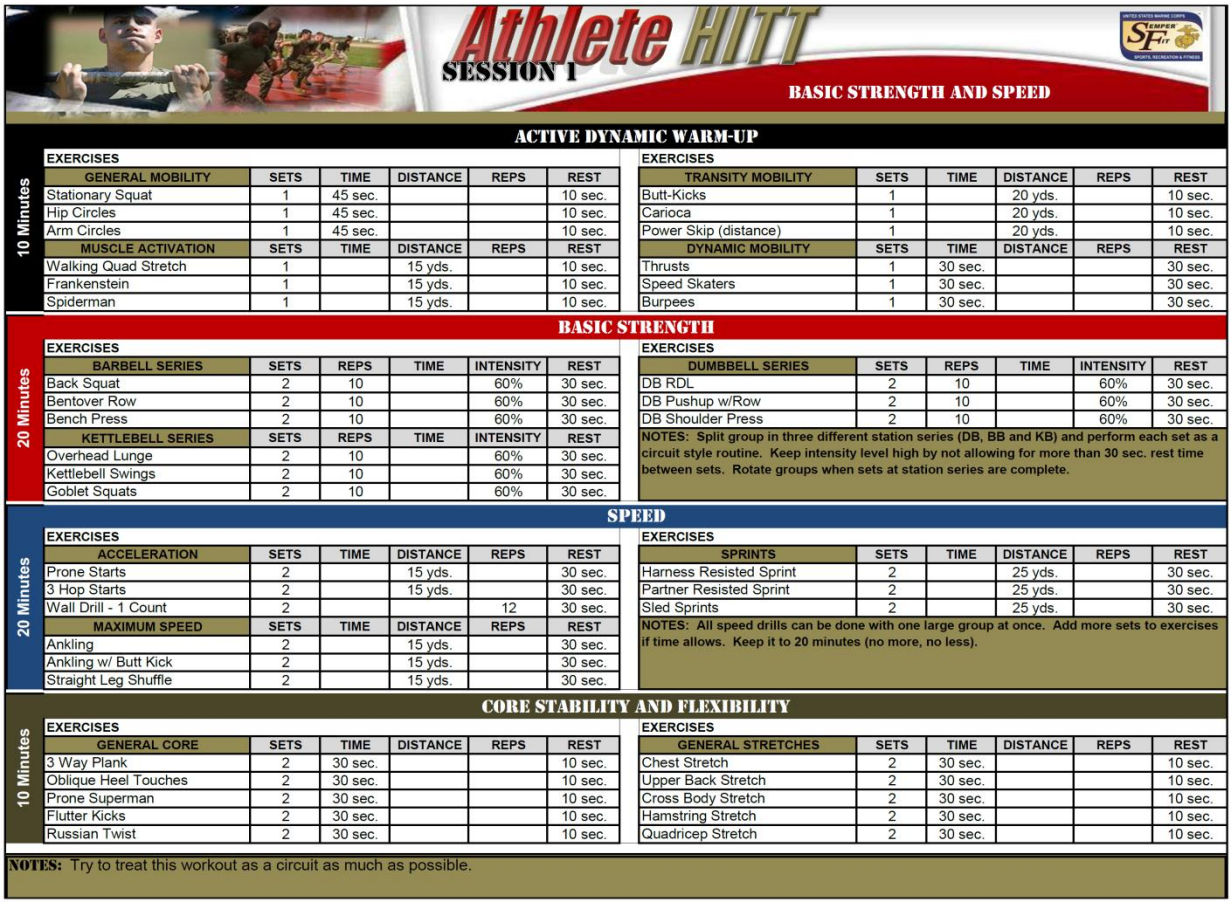
With your buddy sitting on your feet and holding the back of your legs on your calf muscle start with your back on the deck and come to a full sit-up position. Your head should break the plane of your knees. Complete 50 to 100 repetitions.

These are just a few examples of the 4 major components of the HITT combat performance enhancement program which include Active Dynamic Warm-Up, Strength and Power, Speed and Agility, and Flexibility and Core Stability. The HITT workout program can be customized and used by leaders or individual Marines as a training tool to plan and execute personal or unit's fitness training program, including pre-deployment, deployment, and post deployment.

The below templates are designed to allow individuals to develop and tailor a Physical Training Plan to an individual's unique training requirements, timeline, and tempo. This template uses the framework established by the High Intensity Tactical Training (HITT) Program, with the options to include other physical training events (e.g. MCMAP, Water Survival Training, Commander's Choice) as needed/required. The HITT program is a comprehensive combat-specific strength and conditioning program that complements a Commander's/Individual Marine's combat conditioning program.

Athlete Exercise

Athlete level of training is the first of a three-level system that increases gradually in demand and intensity. This level is designed for Marines who have an acceptable level of fitness but are not regular athletes. This Athlete level provides 25 different training programs with escalating levels of fitness difficulty or physical demand. A collection of short instructional videos is also provided for demonstration purposes. This level can be used to evaluate initial strength or fitness levels. When this level becomes too easy then Combat level should be considered. This level is recommended during early phases of pre-deployment and post-deployment training periods.



Athlete HITT

SESSION 1

BASIC STRENGTH AND SPEED

ACTIVE DYNAMIC WARM-UP

10 Minutes

EXERCISES

GENERAL MOBILITY	SETS	TIME	DISTANCE	REPS	REST
Stationary Squat	1	45 sec.			10 sec.
Hip Circles	1	45 sec.			10 sec.
Arm Circles	1	45 sec.			10 sec.
MUSCLE ACTIVATION	**SETS**	**TIME**	**DISTANCE**	**REPS**	**REST**
Walking Quad Stretch	1		15 yds.		10 sec.
Frankenstein	1		15 yds.		10 sec.
Spiderman	1		15 yds.		10 sec.

EXERCISES

TRANSITY MOBILITY	SETS	TIME	DISTANCE	REPS	REST
Butt-Kicks	1		20 yds.		10 sec.
Carioca	1		20 yds.		10 sec.
Power Skip (distance)	1		20 yds.		10 sec.
DYNAMIC MOBILITY	**SETS**	**TIME**	**DISTANCE**	**REPS**	**REST**
Thrusts	1	30 sec.			30 sec.
Speed Skaters	1	30 sec.			30 sec.
Burpees	1	30 sec.			30 sec.

BASIC STRENGTH

20 Minutes

EXERCISES

BARBELL SERIES	SETS	REPS	TIME	INTENSITY	REST
Back Squat	2	10		60%	30 sec.
Bentover Row	2	10		60%	30 sec.
Bench Press	2	10		60%	30 sec.
KETTLEBELL SERIES	**SETS**	**REPS**	**TIME**	**INTENSITY**	**REST**
Overhead Lunge	2	10		60%	30 sec.
Kettlebell Swings	2	10		60%	30 sec.
Goblet Squats	2	10		60%	30 sec.

EXERCISES

DUMBBELL SERIES	SETS	REPS	TIME	INTENSITY	REST
DB RDL	2	10		60%	30 sec.
DB Pushup w/Row	2	10		60%	30 sec.
DB Shoulder Press	2	10		60%	30 sec.

NOTES: Split group in three different station series (DB, BB and KB) and perform each set as a circuit style routine. Keep intensity level high by not allowing for more than 30 sec. rest time between sets. Rotate groups when sets at station series are complete.

SPEED

20 Minutes

EXERCISES

ACCELERATION	SETS	TIME	DISTANCE	REPS	REST
Prone Starts	2		15 yds.		30 sec.
3 Hop Starts	2		15 yds.		30 sec.
Wall Drill - 1 Count	2			12	30 sec.
MAXIMUM SPEED	**SETS**	**TIME**	**DISTANCE**	**REPS**	**REST**
Ankling	2		15 yds.		30 sec.
Ankling w/ Butt Kick	2		15 yds.		30 sec.
Straight Leg Shuffle	2		15 yds.		30 sec.

EXERCISES

SPRINTS	SETS	TIME	DISTANCE	REPS	REST
Harness Resisted Sprint	2		25 yds.		30 sec.
Partner Resisted Sprint	2		25 yds.		30 sec.
Sled Sprints	2		25 yds.		30 sec.

NOTES: All speed drills can be done with one large group at once. Add more sets to exercises if time allows. Keep it to 20 minutes (no more, no less).

CORE STABILITY AND FLEXIBILITY

10 Minutes

EXERCISES

GENERAL CORE	SETS	TIME	DISTANCE	REPS	REST
3 Way Plank	2	30 sec.			10 sec.
Oblique Heel Touches	2	30 sec.			10 sec.
Prone Superman	2	30 sec.			10 sec.
Flutter Kicks	2	30 sec.			10 sec.
Russian Twist	2	30 sec.			10 sec.

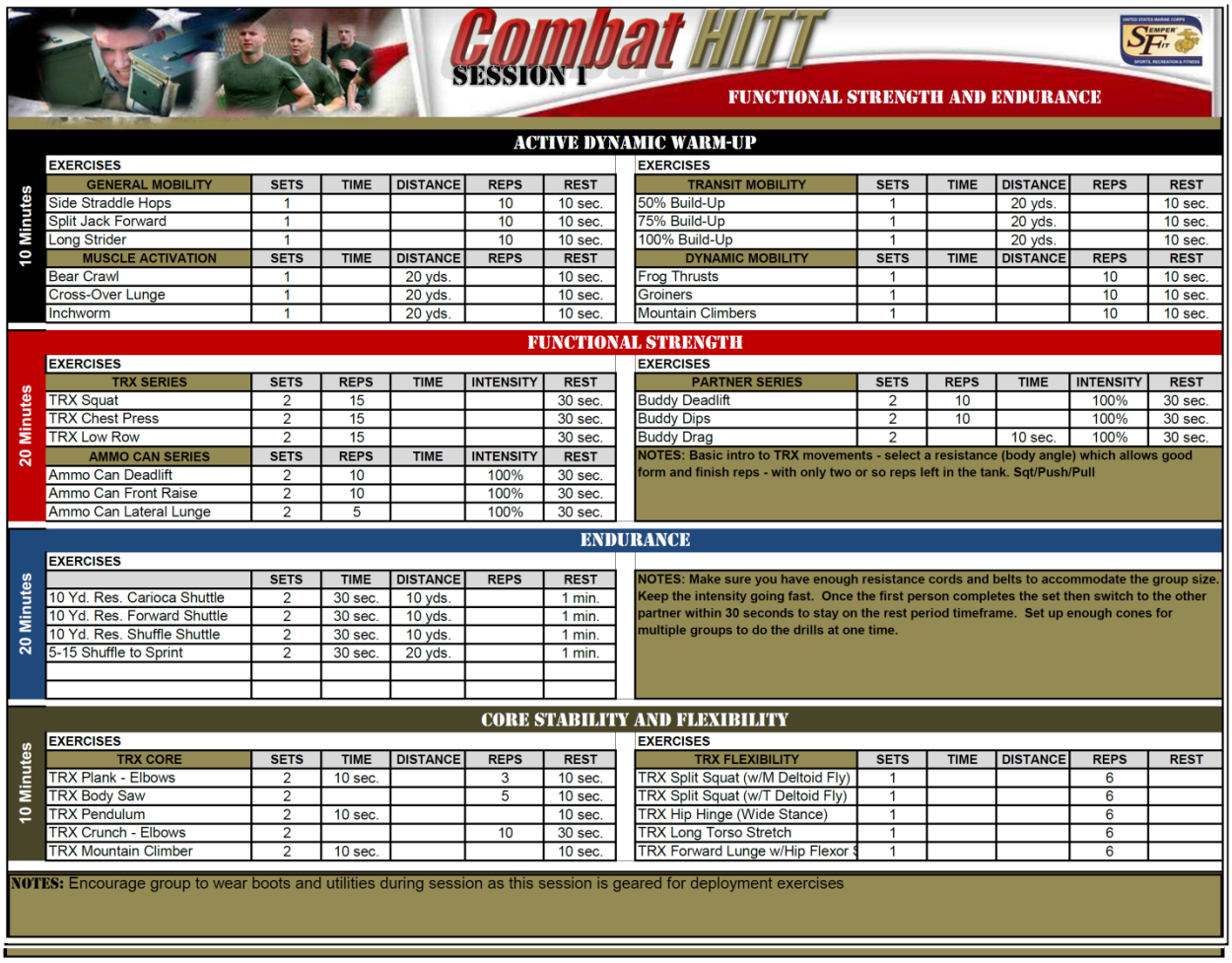
EXERCISES

GENERAL STRETCHES	SETS	TIME	DISTANCE	REPS	REST
Chest Stretch	2	30 sec.			10 sec.
Upper Back Stretch	2	30 sec.			10 sec.
Cross Body Stretch	2	30 sec.			10 sec.
Hamstring Stretch	2	30 sec.			10 sec.
Quadricep Stretch	2	30 sec.			10 sec.

NOTES: Try to treat this workout as a circuit as much as possible.

Combat Exercise

Combat level of training is the second of the three-level HITT system that has been designed to increase gradually in physical demand and levels of intensity. This level is designed for Marines who with strong levels of athletic fitness abilities. This level provides 25 different training programs with escalating levels of fitness difficulty or physical demand. A collection of short instructional videos is also provided for demonstration purposes. This level should be used when the Athlete HITT level becomes easy. This level is recommended during Pre-deployment and the deployment training periods.



Combat HITT
SESSION 1
FUNCTIONAL STRENGTH AND ENDURANCE

ACTIVE DYNAMIC WARM-UP — 10 Minutes

EXERCISES

GENERAL MOBILITY	SETS	TIME	DISTANCE	REPS	REST
Side Straddle Hops	1			10	10 sec.
Split Jack Forward	1			10	10 sec.
Long Strider	1			10	10 sec.
MUSCLE ACTIVATION	**SETS**	**TIME**	**DISTANCE**	**REPS**	**REST**
Bear Crawl	1		20 yds.		10 sec.
Cross-Over Lunge	1		20 yds.		10 sec.
Inchworm	1		20 yds.		10 sec.

EXERCISES

TRANSIT MOBILITY	SETS	TIME	DISTANCE	REPS	REST
50% Build-Up	1		20 yds.		10 sec.
75% Build-Up	1		20 yds.		10 sec.
100% Build-Up	1		20 yds.		10 sec.
DYNAMIC MOBILITY	**SETS**	**TIME**	**DISTANCE**	**REPS**	**REST**
Frog Thrusts	1			10	10 sec.
Groiners	1			10	10 sec.
Mountain Climbers	1			10	10 sec.

FUNCTIONAL STRENGTH — 20 Minutes

EXERCISES

TRX SERIES	SETS	REPS	TIME	INTENSITY	REST
TRX Squat	2	15			30 sec.
TRX Chest Press	2	15			30 sec.
TRX Low Row	2	15			30 sec.
AMMO CAN SERIES	**SETS**	**REPS**	**TIME**	**INTENSITY**	**REST**
Ammo Can Deadlift	2	10		100%	30 sec.
Ammo Can Front Raise	2	10		100%	30 sec.
Ammo Can Lateral Lunge	2	5		100%	30 sec.

EXERCISES

PARTNER SERIES	SETS	REPS	TIME	INTENSITY	REST
Buddy Deadlift	2	10		100%	30 sec.
Buddy Dips	2	10		100%	30 sec.
Buddy Drag	2		10 sec.	100%	30 sec.

NOTES: Basic intro to TRX movements - select a resistance (body angle) which allows good form and finish reps - with only two or so reps left in the tank. Sqt/Push/Pull

ENDURANCE — 20 Minutes

EXERCISES

	SETS	TIME	DISTANCE	REPS	REST
10 Yd. Res. Carioca Shuttle	2	30 sec.	10 yds.		1 min.
10 Yd. Res. Forward Shuttle	2	30 sec.	10 yds.		1 min.
10 Yd. Res. Shuffle Shuttle	2	30 sec.	10 yds.		1 min.
5-15 Shuffle to Sprint	2	30 sec.	20 yds.		1 min.

NOTES: Make sure you have enough resistance cords and belts to accommodate the group size. Keep the intensity going fast. Once the first person completes the set then switch to the other partner within 30 seconds to stay on the rest period timeframe. Set up enough cones for multiple groups to do the drills at one time.

CORE STABILITY AND FLEXIBILITY — 10 Minutes

EXERCISES

TRX CORE	SETS	TIME	DISTANCE	REPS	REST
TRX Plank - Elbows	2	10 sec.		3	10 sec.
TRX Body Saw	2			5	10 sec.
TRX Pendulum	2	10 sec.			10 sec.
TRX Crunch - Elbows	2			10	30 sec.
TRX Mountain Climber	2	10 sec.			10 sec.

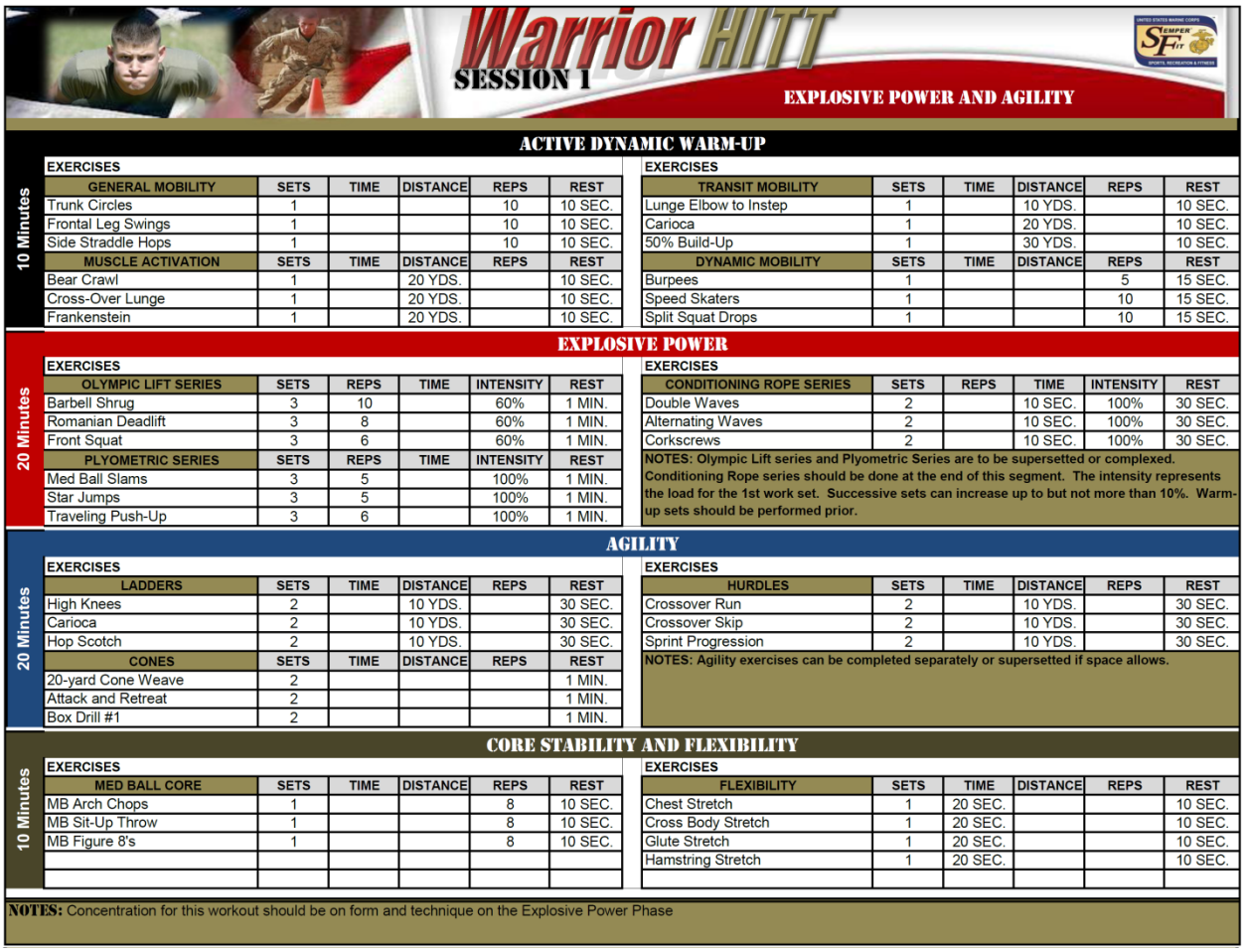
EXERCISES

TRX FLEXIBILITY	SETS	TIME	DISTANCE	REPS	REST
TRX Split Squat (w/M Deltoid Fly)	1			6	
TRX Split Squat (w/T Deltoid Fly)	1			6	
TRX Hip Hinge (Wide Stance)	1			6	
TRX Long Torso Stretch	1			6	
TRX Forward Lunge w/Hip Flexor S	1			6	

NOTES: Encourage group to wear boots and utilities during session as this session is geared for deployment exercises

Warrior Exercise

Warrior level of training is the highest and most demanding of three-level HITT training and combat conditioning system. This level is designed for Marines with strong athletic abilities who are seeking to maintain athletic abilities and improve combat conditioning. This level provides 25 different training programs with escalating levels of fitness difficulty or physical demand. A collection of short instructional videos is also provided for demonstration purposes. This level is recommended for use during late stages of pre-deployment and during post-deployment training periods.



Warrior HITT

SESSION 1

EXPLOSIVE POWER AND AGILITY

ACTIVE DYNAMIC WARM-UP — 10 Minutes

EXERCISES					
GENERAL MOBILITY	SETS	TIME	DISTANCE	REPS	REST
Trunk Circles	1			10	10 SEC.
Frontal Leg Swings	1			10	10 SEC.
Side Straddle Hops	1			10	10 SEC.
MUSCLE ACTIVATION	SETS	TIME	DISTANCE	REPS	REST
Bear Crawl	1		20 YDS.		10 SEC.
Cross-Over Lunge	1		20 YDS.		10 SEC.
Frankenstein	1		20 YDS.		10 SEC.

EXERCISES					
TRANSIT MOBILITY	SETS	TIME	DISTANCE	REPS	REST
Lunge Elbow to Instep	1		10 YDS.		10 SEC.
Carioca	1		20 YDS.		10 SEC.
50% Build-Up	1		30 YDS.		10 SEC.
DYNAMIC MOBILITY	SETS	TIME	DISTANCE	REPS	REST
Burpees	1			5	15 SEC.
Speed Skaters	1			10	15 SEC.
Split Squat Drops	1			10	15 SEC.

EXPLOSIVE POWER — 20 Minutes

EXERCISES					
OLYMPIC LIFT SERIES	SETS	REPS	TIME	INTENSITY	REST
Barbell Shrug	3	10		60%	1 MIN.
Romanian Deadlift	3	8		60%	1 MIN.
Front Squat	3	6		60%	1 MIN.
PLYOMETRIC SERIES	SETS	REPS	TIME	INTENSITY	REST
Med Ball Slams	3	5		100%	1 MIN.
Star Jumps	3	5		100%	1 MIN.
Traveling Push-Up	3	6		100%	1 MIN.

EXERCISES					
CONDITIONING ROPE SERIES	SETS	REPS	TIME	INTENSITY	REST
Double Waves	2		10 SEC.	100%	30 SEC.
Alternating Waves	2		10 SEC.	100%	30 SEC.
Corkscrews	2		10 SEC.	100%	30 SEC.

NOTES: Olympic Lift series and Plyometric Series are to be supersetted or complexed. Conditioning Rope series should be done at the end of this segment. The intensity represents the load for the 1st work set. Successive sets can increase up to but not more than 10%. Warm-up sets should be performed prior.

AGILITY — 20 Minutes

EXERCISES					
LADDERS	SETS	TIME	DISTANCE	REPS	REST
High Knees	2		10 YDS.		30 SEC.
Carioca	2		10 YDS.		30 SEC.
Hop Scotch	2		10 YDS.		30 SEC.
CONES	SETS	TIME	DISTANCE	REPS	REST
20-yard Cone Weave	2				1 MIN.
Attack and Retreat	2				1 MIN.
Box Drill #1	2				1 MIN.

EXERCISES					
HURDLES	SETS	TIME	DISTANCE	REPS	REST
Crossover Run	2		10 YDS.		30 SEC.
Crossover Skip	2		10 YDS.		30 SEC.
Sprint Progression	2		10 YDS.		30 SEC.

NOTES: Agility exercises can be completed separately or supersetted if space allows.

CORE STABILITY AND FLEXIBILITY — 10 Minutes

EXERCISES					
MED BALL CORE	SETS	TIME	DISTANCE	REPS	REST
MB Arch Chops	1			8	10 SEC.
MB Sit-Up Throw	1			8	10 SEC.
MB Figure 8's	1			8	10 SEC.

EXERCISES					
FLEXIBILITY	SETS	TIME	DISTANCE	REPS	REST
Chest Stretch	1	20 SEC.			10 SEC.
Cross Body Stretch	1	20 SEC.			10 SEC.
Glute Stretch	1	20 SEC.			10 SEC.
Hamstring Stretch	1	20 SEC.			10 SEC.

NOTES: Concentration for this workout should be on form and technique on the Explosive Power Phase

APPENDIX C
Leading Physical Training (PT)

"To lead an untrained people to war is to throw them away."
- Confucius: Analects xiii,c. 500 B.C.

The purpose of this Appendix is to provide the student with a tool to use in leading a physical training (PT) program. The ultimate objective of this section is to enable the student to be able to lead and instruct a unit in physical readiness training (PRT). This section covers the benefits of a PT program, the exercises that help prevent injuries associated with PT, the benefits of using an obstacle course, and the benefits of using rifle drill exercises. The drills and formations discussed in this section may be adapted to your own drill and formation procedures.

Leader's Objective. As a physical readiness training instructor, the leader has two general objectives. The first is to motivate Marines to want to be physically fit. The second is to conduct a program that will develop a high degree of physical fitness. Motivated Marines will react enthusiastically to such a program. It aids greatly in achieving local program objectives.

Leader's Personal Fitness. A unit leader who must instruct and demonstrate physical activities must be in physical condition to do the job without undue physical stress. The leader should be able to do those things that must be demonstrated. The leader's strength, endurance, posture, and skill should set the example. This does not mean that the leader must excel, as other Marines do not expect championship performance. However, they do expect, and deserve, a creditable showing of fitness for the job.

Leader's Knowledge. The leader must have three types of knowledge to properly administer physical readiness training. They are—

- **Knowledge of Marines.** The leader must understand Marines, know how to lead and motivate them, understand how they learn, and apply this knowledge wisely in the day-to day training situation.
- **Understanding of Body Functioning.** A more intelligent exercise program results from understanding and applying the principles which govern physical conditioning of the body. The leader with such knowledge can better prescribe, adjust, and regulate exercise types, amounts, and progression to attain fitness.
- **Understanding Exercise Activities.** The leader needs to understand the contribution each type of physical activity makes to physical fitness, and how to use each activity to develop fitness. Skill to demonstrate and lead the various activities is a necessary part of technique and is invaluable to the instructor or small-unit leader.

Psychological Leadership. The full development of a Marine's resources is not all physical. To be effective in developing physical readiness, leaders must realize that mind and attitude are also important to success. The more important psychological considerations are to—

Promote Understanding of the Value of Physical Readiness. A desire to be physically ready should be created in all Marines. Motivation is increased and Marines take greater interest in their individual physical fitness if they understand the value and benefits of vigorous exercise. When Marines realize their efforts are an investment in their own personal welfare, it should not be difficult to obtain their cooperation. Marines should understand the objectives, the benefits, and the value of each type of exercise activity in their program. They should also understand the relation of physical readiness to survival in combat.

Maintain a Positive Approach. Physical readiness training for combat is strenuous and demanding. It is a responsibility of leadership to create an atmosphere where all desire to participate fully. This attitude should be fostered. A negative approach must not be identified with physical readiness training, even with those having difficulty. Only in unusual cases should fear of punishment be the motivating factor behind good performance. For those few who cannot keep up or attempt to malinger, an effective remedial program is essential.

Seek Cooperation and Develop Morale. In a program placing maximum physical stress upon individuals, it is necessary to gain their cooperation. Favorable reaction is enhanced by proper planning and organization, challenging requirements, use of competition, and application of a progressive program resulting in physical fitness. As physical fitness grows, morale also grows.

Command and Supervisory Functions

Command Functions. Commanders should take the following actions to support physical readiness training:

- Lead by personal example.
- Instill command interest and indicate to subordinate personnel the importance of this training to the welfare of the organization.
- Allot sufficient time for the achievement of objectives and monitor the use of such allotted time. The substitution of other training or routine duties for scheduled physical readiness training is unsound and unwise.
- Assign and properly utilize qualified personnel to supervise and conduct physical readiness training. If leaders are not competent, take action to ensure they become competent quickly.
- Reassign those who do not meet this standard to other duties.
- Make necessary facilities and funds available to support a program to develop physical readiness within all personnel.
- Measure the physical fitness of individuals and units in order to evaluate progress and to determine if the program is successful.

Supervisory Functions. Leaders responsible for planning, conducting, and supervising physical readiness training should take the following actions:

- Prepare physical readiness training schedules which apply the principles of physical conditioning and which aim for a particular type of program plan.
- Provide for wide participation of as many Marines as possible. All Marines, regardless of position or age, will benefit from regular exercise. In some instances, special efforts are necessary to overcome obstacles to regular and frequent training. Special effort is also necessary to ensure remedial conditioning. Such conditioning should occur for those who are physically substandard and after extended absence due to leave, sickness, injury, and travel.
- Prevent waste or unwise use of time allotted for physical readiness training. Time-wasters include unprepared instructors; assignment of one instructor to a group larger than a platoon; progression which does not keep pace with the physical development of the Marines; extreme formality; inadequate equipment or facilities which require waiting turns to exercise; and lengthy rest periods between exercises which interfere with the application of overload.
- Ensure that the program contains vigorous physical activity. Such activity places progressively greater demands upon the body during each exercise session and also over the duration of the training program. To be of benefit, exercise must tire the muscles and cause the heart to increase its rate of beat.
- Set an overall objective for each physical fitness program. Observe the training as necessary to ensure that the established objectives are being achieved.
- Observe physical readiness training to insure the use of a positive approach. To implement a positive attitude, small-unit leaders and instructors should personally set the example; have an understanding, fair, and sympathetic attitude; recognize individual differences; and motivate Marines to give forth their best effort.
- Guide and inform small-unit leaders and instructors concerning approved techniques, directives, and literature. As necessary, arrange for local training of instructors to include clinics, conferences, schools, and demonstrations.
- Determine the effectiveness of physical readiness training by personal participation in and observation of training, analysis of field inspection reports, and analysis of individual physical fitness test scores. Scores may be combined to reflect the fitness of the unit.

FORM A UNIT FOR PHYSICAL TRAINING. The first step us to get your unit into some sort of formation that is conducive to PRT. The unit leader is responsible for determining which type of formation his unit will be in. The only requirement is that each individual has enough room to perform each exercise.

TECHNIQUES OF LEADERSHIP AND MOTIVATION. Unit leaders need to display confidence in their ability to lead and motivate others by word or actions. They not only need to motivate others; they need to be motivated themselves. Unit leaders must also *set the example* by demonstrating their attention to duty. They should be in the correct uniform and with the correct equipment (i.e. canteen, road guard vest). All unit leaders must be able to demonstrate knowledge of the exercises that they lead.

TYPES OF PHYSICAL CONDITIONING PROGRAMS. Because military units are different in organization and mission, PT programs have to be tailored to the specific unit's mission and current state of physical readiness. The different programs, which are designed to meet the different physical, are as follows:

Developmental Program. Individuals in a beginning or poor state of physical readiness need a program that will develop strength, endurance, physical skills, and character traits which are vital to the successful accomplishment of military missions. These programs should be progressive - to rise gradually to a peak of fitness and skill. An example of this type of program is seen at the recruit depots, where we take young people, some of whom had no physical training background and give them a regimented fitness program that starts at an easy level and progressively gets harder.

Maintenance. This program is designed to maintain an individual or unit at its current level of physical readiness. Even though it is not often heard of being referred to as this, it is the most common type of PT program in the Marine Corps. An example of this is would be our unit's regular PT program.

Leadership Development. The purpose of this type of program is to train small-unit leaders to conduct physical readiness training within their unit. This type of program is used at each Staff NCO Academy.

Remedial Program. The term "Remedial" is used for the program, which focuses on those individuals or groups who possess substandard levels of physical fitness. In order for any unit to achieve a full level of operational readiness, it is necessary to bring everyone in the unit up to the prescribed standard. This type of program will consist of individuals who are overweight, who fail to reach the minimum standards of the physical fitness test, who are unmotivated or those who have been absent due to illness, injury, extended hospitalization or other absences. Personnel in a limited or no duty status should attend all training sessions, if for no other reason than to observe, assist or supervise as necessary. Remember, remedial PT is only a supplement to your unit's regular physical readiness training program, it should not replace it.

BENEFITS OF A PHYSICAL TRAINING (PT) PROGRAM. The benefits of exercise are not always understood. Some of the more important results of exercise are:

Improved Muscle Tone and Strength. Muscular tone improves, and at the same time, muscular strength and endurance are built up.

Cardiovascular-Respiratory Endurance. Cardiovascular-respiratory endurance, or commonly known as wind, improves by opening dormant lung capacity to absorb greater amounts of oxygen which in turn increases endurance.

Circulation. The speeding up of the blood throughout the body, sending blood to those parts of the body that are being worked. This improves the effectiveness of the heart lungs and blood vessels.

Flexibility. A wider range of muscular movement is possible and rapidity in physical skills grows.

Elimination of Body Waste. Bending and twisting the body and the general speedup of body processes caused by exercise regulate and help eliminate body waste.

Tension. Working off excess nervous energy and relief from daily worries and cares relieve tension. Participation in exercise leaves little time for worry.

Sleep. Sleep improves because muscles are healthfully tired after a bout of exercise. A by-product of sound sleep is relief of tension.

Weight Control. Control of obesity (fat) is made possible by using up excessive amounts of fat-producing food elements.

Injury Susceptibility. Susceptibility to injury is reduced through exercise. Muscles, tendons, and joints are strengthened. Injuries such as hernia, back strain, and joint sprains are less likely to occur if muscles are maintained in proper tone.

EXERCISES THAT PREVENT INJURIES. Preventing injuries is a very important part of physical training and must be taken seriously, but before beginning any physical activity, you must prepare the body for exercise by warming up. Each unit leader is responsible for conducting warm-up exercises. There are many exercises that can help you prevent injuries while participating in physical training. There are also a variety of stretching exercises for different areas of the body. The HITT Program is a comprehensive series of warm-up, conditioning, and cool-down exercises. This all-encompassing program can be incorporated into any unit aerobic or anaerobic conditioning session, or can be used as a conditioning session in of itself.

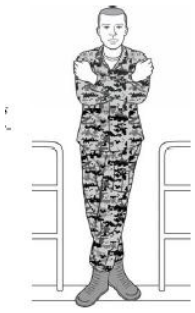
BENEFITS OF AN OBSTACLE COURSE. The main benefit of an obstacle course is that it helps develop military physical skills that will aid in accomplishing your unit mission. As with the circuit course, it can be used to add variety to your physical readiness-training program. It is important that you, as the small unit leader are able to and in fact do explain and demonstrate the correct ways to negotiate all obstacles before allowing Marines to traverse through them. There are two types of obstacle courses.

Conditioning Course. This course has low obstacles that must be negotiated quickly. Running the course can be a test of the Marine's basic motor skills and physical condition and, if negotiated on a regular basis will improve them. When a Marine becomes proficient at negotiating all the obstacles he can run it for time.

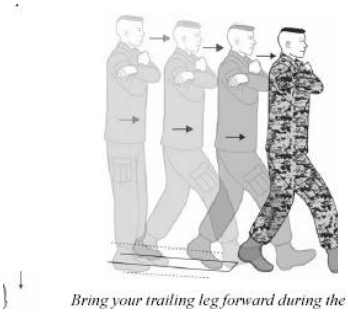
Confidence Course. A confidence course has higher obstacles than the conditioning course. It brings out a Marine's confidence in their abilities to negotiate these types of obstacles. Marines are encouraged to go through these types of courses, but must never be run against time.

APPENDIX D
Combat Water Survival

Abandoning Ship Technique. When abandoning ship, safety considerations must be observed. Use the following technique when abandoning ship without your combat gear:

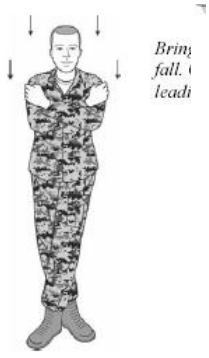


- Place your hands on their opposite shoulders, forming a crisscross pattern.
- Step to the edge of the ship's deck and check the water below for debris or survivors. If water is clear, look straight ahead and prepare to jump. If the water is not clear, move to another location.

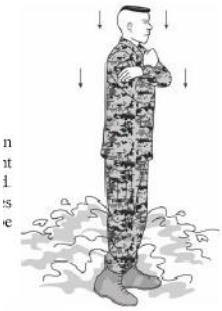


Bring your trailing leg forward during the

- Step off the side of the ship with a smooth, 30-inch stride. DO NOT DIVE OFF THE SHIP. DO NOT LOOK DOWN AT THE WATER. LOOK STRAIGHT AHEAD. Looking down at the water can render you unconscious or cause injuries upon impact.



- Bring our trailing leg forward during the fall. Cross your trailing leg behind your leading leg.



- Keep your head parallel to the water's surface until hitting the water.
- You should remain in the abandon ship position until your descent into the water has almost stopped. However, the weight imbalances in your body may cause you to be in a "J" shape under the water.

- Once your downward motion has ceased, your feet may be parallel with the ocean bottom or you may be nearly inverted with your feet over your head. To counteract potential disorientation, you should pause briefly and allow the natural buoyancy of our torso to bring your body to a nearly upright position.

- Floating debris can cause hazards. Therefore, you should swim upward, extending one arm (hand is shaped as a fist) upward to feel for obstructions. If you encounter debris, try to push it away or surface in a different location.
- Swim away from the ship. DO NOT LOOK BACK AT THE SHIP. Looking back could slow your movement away from the area. Remember, your objective is to leave the area as quickly as possible because
    - Equipment and debris may be falling from or spilling out of the ship.
    - Additional casualties can occur if individuals abandoning the ship fall on top of swimmers already in the water.
    - Swimmers close to the sinking ship may get pulled underneath the water by the suctioning effect of the ship as it goes under.

***Note: DO NOT hold your nose as you abandon ship. If you do hold your nose, the force of impact into the water could jar your arm and hand and cause you to break your nose.**

Modified Abandoning Ship Technique. When abandoning ship while wearing full combat gear (weapon, helmet, and a properly waterproofed pack), safety considerations must be observed. The modified abandoning ship technique is used while wearing full combat gear and exiting from a height less than 30 feet.

WARNING:
When exiting from a height greater than 30 feet, remove your helmet and pack. Fasten the helmet to the pack or place it inside the pack before jettisoning. If jettisoning gear from the ship or aircraft, check the water below for survivors before throwing the gear forward of the intended jump area. Once in the water, retrieve your gear and swim out of the area.

- Place your weapon over one shoulder, muzzle down, with the weapon parallel to your side.
- Place your arm and hand along the weapon and hold it to your side.
- Take our free hand and place it on top of your helmet to prevent neck/spinal injury from the force of the water pulling upward on the helmet as your body enters the water. Note*

*Note: An alternate method is to place your weapon over one shoulder, muzzle down, with the weapon parallel to your side. Reach across your body and grasp the sling of our weapon and hold it to our body. Take your free hand and place it on top of your helmet.

- Step to the edge of the platform and check the water below for debris and survivors. If the water is clear, look straight ahead and prepare to jump. If the water is not clear, move to another location.

- Step off the side of the platform with a smooth, 30-inch stride. DO NOT DIVE OFF THE SHIP, do not look down at the water, look straight ahead. Looking down at the water can render you unconscious or cause injury upon impact.
- Bring your trailing leg forward during the fall. Cross your trailing leg behind your leading let.
- Keep our head parallel to the water's surface until hitting the water.

- You should remain in the modified abandoning ship position until your descent into the water has almost stopped. The buoyancy of a properly waterproofed pack will immediately pull you to the surface. Once you break the water's surface, unsling our weapon and loop the sling over your head. You may have to seesaw the sling so as to ensure the sling passes between your helmet and pack. Once over your head, loop the sling around your neck with the weapon aligned in the center of your body, muzzle down. Lean back on your pack and perform the combat travel stroke to exit the area. Note**

**Note: You may also remove the pack (unsnap the quick-release strap on one side of the pack, and pass the strap to your other hand in order to maintain contact with the pack, which is

functioning as your flotation device). Remain horizontal in the water with your pack under our chest. Perform a breast stroke kick.

Surface Burning Oil Swim. After you have abandoned ship, rise to the surface using the techniques previously described. However, you must remember that fuel from sinking ships or downed aircraft will float on the surface of the water. Therefore, you must move clear of the floating fuel by swimming away from the ship or aircraft as soon as possible. Either swim upwind (into the wind) of the ship/aircraft or swim against the current. Either method allows you to move away form the fuel and the wind/current will push the fuel past you. To properly execute a surface burning oil swim-

- Extend your arms overhead as far as possible.
- Wave your arms back and forth vigorously to splash a hole while moving upward.
- Splash as long as possible to push burning fuel away from the surfacing area.
- Use your arms and hands to sweep away fuel and debris.
- Kick your legs in a constant breast stroke kick.

- Extend your arms (palms outward) forward on the surface, arms shoulder width apart.
- Pull your hands in and back toward the chest.
- Stop your hands in front of your face and rotate them so that your palms face forward (roughly halfway out of the water).

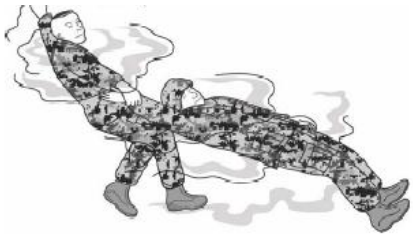
- Sweep your arms forward to a full extension at the shoulder width. This splashes debris, oil, or burning liquids aside. To reduce the chance of fatigue, use two short splashes to the front to extend the path.
- Repeat the preceding step as necessary while swimming clear of the area.

Rescue Techniques

Collar Tow. You perform the collar tow after a victim has been properly leveled off. To perform a collar tow using the victim's blouse-

- Maintain control of the victim by grasping his armpit with one hand and then with your free hand grasp either his combat gear or his blouse between his shoulder blades. If grasping the blouse, grasp the material with your palm up, then turn your hand over to tighten the material.
- Release the victim's armpit once control is established and execute the lifesaving stroke to tow him to safety.

Wrist Tow. Use the wrist tow method to rescue a victim who is floating face down. DO NOT use the wrist tow method on a struggling victim. If time allows, remove your helmet and gear before attempting the rescue. Swim toward the victim using a modified breast stroke. Swim within 2 to 6 yards of the victim to maintain a margin of safety, this allows you to reassess the situation and reassure the victim. The following steps show proper front surface approach, wrist tow procedures:



- Approach the victim from the front and grasp the underside of the victim's left wrist with your left hand or the right wrist with your right hand. Ensure that your thumb is on the underside of victim's wrist.
- Lean back, pulling and kicking strongly to move the victim into a horizontal position.
- Twist the victim's wrist to rotate the victim into a face up position.
- Swim toward safety using the lifesaving stroke. Note*
- Keep a firm grip on the victim's wrist.

- Keep your towing arm fully extended and along your side. This keeps the victim in the water column and prevents drag.
- Ensure the victim's head does not go under water during the recovery.

*Note: The lifesaving stroke is a modified side stroke wherein the top arm is used to tow or carry a victim to safety and use a scissor kick or an inverted scissor kick is used for propulsion.

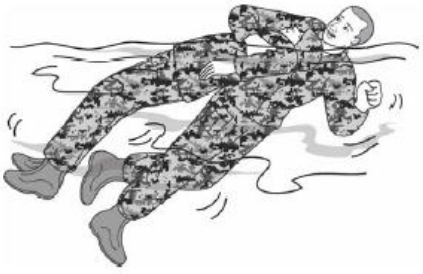
Double Armpit Tow. You perform the double armpit tow after a victim has been properly leveled off. To execute the double armpit tow-

- Place both hands in the victim's armpits.
- Extend both arms fully along your body. You are on your back, and your face is clear of the water.
- Use free breathing
- Reassure the victim at all times

- Use the inverted breast stroke kick (it is the only kick that can be used due to your body position) to tow the victim to safety. (The inverted breast stroke kick is the same kick used in the elementary backstroke.) Your kick must be continuous and vigorous in order to keep the victim's face above the water.

Cross-Chest Carry. Use the cross-chest carry to carry a victim to safety if the victim is struggling or when moving through heavy surf. Remove your helmet and gear before attempting a rescue. Talk constantly to calm the victim. Swim toward the victim using a breast stroke approach stroke. Swim within 2 to 6 yards of the victim to maintain a margin of safety, this allows you to reassess the situation and reassure the victim. The following steps illustrate proper cross-chest carry procedures:

CAUTION: The cross-chest carry causes fatigue even if you are in excellent physical condition.



- Use a level-off technique to place the victim in a horizontal, face-up position.
- Retain a grip on the victim with one hand. Reach over the victim with your free hand to encircle the victim's chest. Place your free hand on the victim's opposite rib cage, just below his armpit.
- Release your grip once you have a secure hold on the victim's chest.
- Swim toward safety using the lifesaving stroke while keeping a firm grip on the victim's chest and your hip on his back.

This procedure brings the victim's face and shoulders clear of the water, and typically the victim stops struggling. Sometimes, however, the victim will struggle during the swim to safety. If this happens, either tighten your grip on the victim or defend yourself.

Defense Against A Drowning Victim

Front Head-Hold Escape. The front head-hold escape allows you to escape when you are facing a victim who is gripping you around your head and neck. To execute the front-head hold escape-

- Take a quick breath and tuck your chin into your shoulder to protect your throat.

- Clap your hands above your head (three times) to submerge instantly. This drags the victim below the water, lifts his arms from around your neck, and typically, he releases his grasp in order to get back to the surface. If he doesn't release his grasp, apply pressure to the victim's brachial pressure points (which are located inside of the upper arm, above the elbow.)

- Thrust the victim's arms up and away.
- Keep your chin tucked to protect your throat, and swim underwater away from the victim and return quickly to the surface at the ready position.
- Stop 2 to 6 yards from the victim to reassess the situation.
- Determine an appropriate course of action.

Rear Head-Hold Escape. The rear head-hold escape allows you to escape when a victim is gripping your head and neck from the rear. To execute the rear head-hold escape-

- Take a quick breath, and tuck your chin down, turn your head to either side, and raise your shoulders to protect your throat.

- Take a strong stroke, clap your hands above your head (three times), and submerge instantly. This drags the victim below the water and, typically, he releases his grasp in order to get back to the surface. If he doesn't release his grasp, apply pressure to the victim's brachial pressure pints (which are located inside the upper arm, above the elbow.)

- Thrust the victim's arms up and away.
- Twist your head and shoulders until free.

- Swim underwater away from the victim and return quickly to the surface.
- Stop 2 to 6 yards from the victim to assess the situation.
- Determine an appropriate course of action

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Double Wrist Grip Escape. The wrist-grip escape is used when a victim grabs your arm or wrist.

- Submerge the victim quickly by reaching across with your free hand, pushing down on the victim's shoulder to submerge him, and kicking to propel your self upward.
- While keeping the victim submerged with your hand on his shoulder, give three hard jerking pulls with your trapped hand in an attempt to break free from his grasp.
- Once free, swim clear of the victim and reassess the situation

.

Life Saving Approaches

Front Surface Approach. The front surface approach is performed when the victim is passive. Approaching a victim from the front may place you in danger because a distressed swimmer or a victim who is active may lunge toward you. To execute a front surface approach-

- Stop 2 to 4 yards from the victim to reassess the situation and reassure the victim.
- Determine which are to use in order to rotate the victim into a face-up position (your right hand on the victim's right wrist or your left hand on the victim's left wrist.)
- Move into position and prepare to grasp the victim.
- Turn sideways and move toward the front of the victim.
- Once in position, reach forward and grab the victim's wrist. Your thumb is on the inside of the victim's wrist, as if you were checking his pulse with your thumb. Your remaining fingers wrap around the victim's wrist.
- Lean back immediately and execute a powerful scissor kick or inverted scissor kick and perform short, vigorous pulls with your free arm.
- As the victim begins to move forward in the water, kick, pull, and twist outboard on the victim's wrist. The momentum created from the kick and the pulling and twisting action of the victim's wrist will rotate the victim into a face-up and horizontal position in the water.
- Extend and lock your towing arm down the length of your body and execute a wrist tow to move the victim to safety.

Rear Approach. If the victim is active, you must remember that his response can change rapidly. Therefore, approaching him from the front could be extremely dangerous. The victim could easily grab you and take you under the water during a state of panic. Therefore, use a rear approach when possible. When approaching a victim from the rear, reassure the victim until you get to within 2 to 6 yards of the victim; at that point, stop talking to the victim in order to maintain an element of surprise.

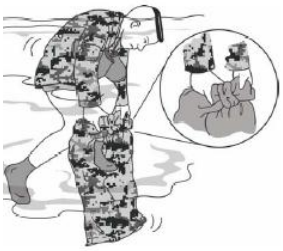
Staying Afloat Without A Life Preserver

Floating With Inflated Trousers. In warm water, trousers can be used as a primary expedient flotation device. However, in cold water, submerging your head to remove and inflate your trousers results in heat and energy losses that negate the benefit of using the trousers as a flotation device. Once your trousers are inflated, you float motionlessly as if wearing a life preserver. As trousers dry, air leaks out of the legs. To slow this process, occasionally splash water on the fabric. Reinflate trousers as needed.

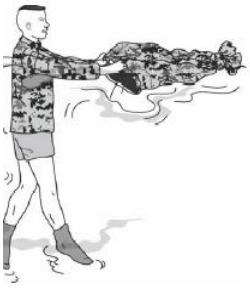
Splash Method. The splash method is an alternative to the sling method. As with the sling method, you must kick strongly to remain at the surface. To inflate trousers using the splash method, perform the following:

- Take a deep breath, bend over, and remove your boots. Note*

- Remove your trousers. Button or zip the trouser fly closed. This allows you to control the airflow.



- Tie the bottoms of the trouser legs in a square knot.
- Ensure that the front (fly) of the trousers faces you.



- Hold the trousers at the water's surface out in front of you by the waistband with the fly up.
- Grasp the waistband at the surface with one hand. Insert your free hand into the waistband, palm down.

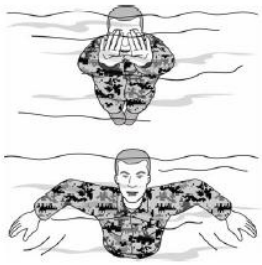
Note*: Retain your boots. Tie the bootlaces together and suspend the boots from your blouse or hang them around your neck so that they rest on your chest.

Drownproofing Methods

Breast Stroke. Use this stroke to swim underwater, through oil or debris, and in rough seas. If you are a good swimmer and not wearing combat gear, the breast stroke is the best stroke for long-range swimming because it provides good visibility and allows you to conserve your energy and maintain a reasonable speed.

Body Position:

- Lie prone in the water. Swim with your trunk and legs projecting back and down at an angle of 20 to 30 degrees.
- Extend arms out in front (hands together [side by side]), and extend legs behind (toes pointed) to prevent drag.
- Face downward, looking forward at a 45degree angle to break the water and to prevent water from washing into the collar area causing drag. This is known as a glide.



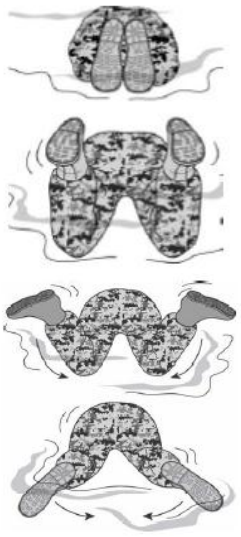
Arm Action:

- Turn your palms outward and bend your arms slightly.
- Sweep your arms sideward and slightly downward until your hands are opposite and slightly below your shoulders.

- Rotate your head up, breathe once your mouth breaks the surface.

- Bring your hands and arms up along your chest and thrust them forward until they are extended and ready to execute

- As the arms start their recovery into the glide, the head should rotate forward, resubmerging the face.



Leg Action

- Draw your heels toward your buttocks, establish a 45 degree bend in the knees.
- Thrust your legs outward and rearward, then squeeze them together. The whipping action of the feet aids forward propulsion.
- This is known as the breast stroke kick.

Breathing

- Inhale during the arm pull and exhale through your mouth and nose during the finish of the breast stroke kick and glide.

Coordination

The stroke movement is in three counts:

- Begin your arm pull. Near the finish of the pull, flex your knees and bring your heels towards your buttocks. The arm pull counteracts the resistance created by the knees.
- As the arm pull is completed, thrust your hands forward, kick your legs outward and rearward, and squeeze them together.
- Glide through the water for approximately 1 to 3seconds or until your forward momentum decreases, then begin the next stroke.

Side Stroke. The side stroke is a survival stroke because you use both arms for buoyancy, with each arm creating a slight propulsion. The majority of your body's propulsion comes from your kick. To execute the side stroke-

Body Position

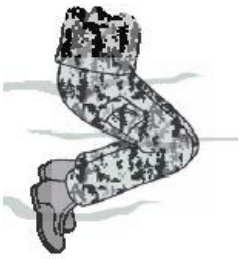
Lie on your side with your lead (bottom) arm extended beyond (with a slight bend in your elbow) and your head in line with your body. Palm is down and your hand is submerged 6 to 8 inches.

- Extend your trail (top) arm down the length of your body over your thigh.
- Keep your legs straight and together, toes pointed rearward.
- Keep your face out of the water, this allows for free breathing. This is known as the glide.

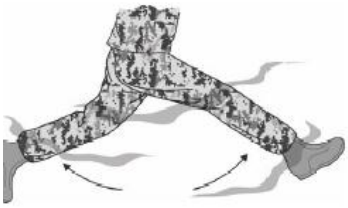
Arm Action

- With your lead arm, pull your arm downward, while flexing at the elbow, until it is straight down from your shoulder.
- Rotate your shoulder and pull your elbow into your side. This should put your lead hand at shoulder level. At the same time, turn your palm toward your face and thrust forward to your original, extended position.
- Draw your right hand upward in front of your chest to shoulder level. Rotate your palm toward your feet, then push it downward in front of your body toward your feet to catch the water.
- Push your trail hand backward to its original position on top of your thigh. (Your trail hand starts forward and meets your lead hand at your chest/shoulder.)

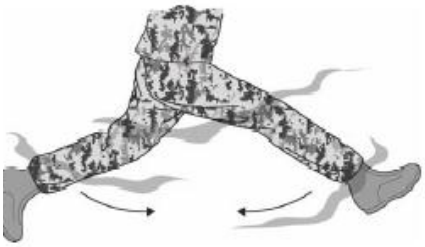
Leg Action



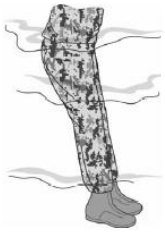
- To perform the scissor kick, the top leg always goes forward and the bottom leg always goes rearward. From the extended position, draw- or recover- your feet toward your buttocks until your legs are bent at a 45 degree angle at the knees and the hips are flexed at a 45 degree angle with the thighs.



- Once the legs have completed their recovery and while maintaining a 45 degree bend in the knees, extend the legs fully into a "V" shape in order to catch the water for propulsion phase.



Once the legs are separated and extended forward and rearward to the "V" position, sweep the legs together until the feet are together.



- You are now in the glide position

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Breathing

- As long as your face remains clear of the water, it is a free breathing stroke. However, it is recommended that you exhale then quickly inhale when the legs are sweeping back together in the scissor kick. This is when the body reaches its highest point in the water, thus clearing the face completely from the surface of the water making it the optimum time to breathe.

Coordination

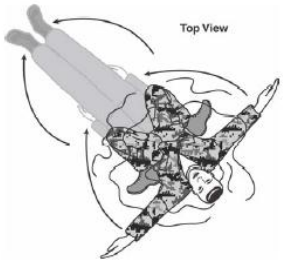
- Begin the stroke with the downward pull of your lead arm.
- At the same time, bring your trail arm upward and draw your knees up to begin the kick.
- Let the thrust of your lead arm, push of your trail arm, and the kick of your legs coincide in order to finish the glide position.
- Glide through the water for approximately 1 to 3 seconds or until your forward momentum decreases, then begin the next stroke.

Elementary Backstroke. The elementary backstroke is also an excellent survival stroke. It relieves the muscles that you use for other strokes, and it is the recommended stroke for weak swimmers or non-swimmers. To execute the elementary backstroke-

Body position

- Start on your back.
- Face up, chest up and hips up, keeping an arch in your lower back with arms pressed to your sides and your legs extended and joined to prevent drag.

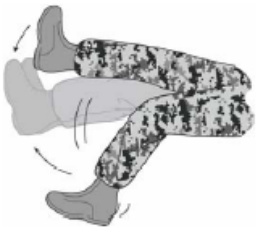
Arm Action



- Trace your hands up your sides to an area near your armpits then extend your arms out to the sides to form the letter "T" (palms facing feet), locking out the elbows. Note*
- Slap your palms to your thighs using a strong sweeping motion.

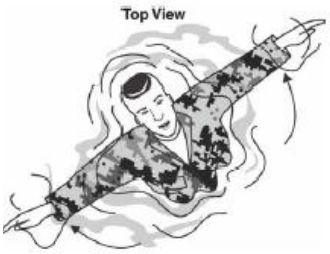
Note* Don't raise your arms above your head. This creates drag, changes your body position, and submerges the head.

Leg Action



- Bend both legs at the knee (90 degree angle) slightly separating your knees and drawing your heels downward to a point under and outside your knees. The knees are spread as wide as the hips or slightly wider depending on the body type of the swimmer.
- Circle around in a shipping action, ending with legs in a glide position.

Breathing



- Breath anytime during this stroke. However, it is recommended that you exhale then quickly inhale when your arms are sweeping back toward your sides and while your legs are sweeping back together. This is when the body reaches its highest point in the water, thus clearing the face completely from the surface of the water and making it the optimum time to breathe.

Coordination

- The stroke movement occurs in three counts (recovery, catch, power.)
- Begin the arm pull (recovery.)

- Near the finish of the pull, flex your knees to a 90 degree angle. The arm pull counteracts the resistance created by the knees.
- Kick out your legs, and squeeze them together as the arm pull is completed (catch, power.)
- Glide through the water for 1 to 3 seconds or until your forward momentum decreases, then begin the next stroke as your momentum slows

References and Acknowledgements

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ACKNOWLEDGMENTS

This Guide is provided to you by the U.S. Marine Corps, Semper Fit, High Intensity Tactical Training and DoD Human Performance Resource Center. The nutrition advice provided within this Guide is proven and has worked well on Marines for years. It is not designed for those with serious medical conditions, special dietary needs, or for use with certain dietary/weight controlling supplements. As with any dietary or physical fitness program you should consult your doctor in advance and have a thorough examination.

"The enemy came. He was beaten. I am tired. Good night."
- Turenne: After the battle of Tunen, 14 June 1658

Semper Fi

Marine Corps Security Cooperation Group
Security Assistance Branch
937 Atlantic Avenue
Fort Story, VA 23459