

## THE MARATHON DYNAMICS TRAINING PROGRAM

The MDI training program is designed to maximize your improvement over a specific time period, while minimizing risk of injury, boredom and/or burnout. Too many get stale by doing too much training, or gradually making every run they do more like the run they last did. No significant fitness gain or performance improvement can occur over time when the stress applied to the body is repeatedly similar. The concept of '**periodization**' holds that '**optimal competitive performance is a long-term process that requires cyclical patterns, repeated at ever higher levels of quality**', according to Jack Daniels, an American coaching guru whose training theories influenced the design of our training plans.

The key principles of periodization fit this acronym: '**S.P.O.R.T.**'

**Specificity** - the stress being applied must be specific to the objective. To run faster, one must train fast part of the time; to run longer, one's training must include incrementally longer runs

**Progression** - the stress must increase progressively, with intermittent periods of rest and recovery

**Overload** - the stress being applied must be greater than the body is already accustomed to, ideally in only one of the following three dimensions at once:

- Frequency--how often?
- Intensity--how hard?
- Time--how long?

**Reversibility** - if the stress being applied is removed for too long, the effect of training will reverse itself, and fitness will decrease

**Threshold of Training** - the point at which the adaptation effect begins to take place

At Marathon Dynamics, we have our own credo, also an acronym, which helps illustrate the principles upon which our training philosophy is founded:

## 'I B.E.L.I.E.V.E.!'

**I-mprovement** – Through 'periodization', MDI's training plans ensure that your running is constantly improving; whether that means faster, longer, easier, more consistently or more enjoyably. If you aren't noticing gradual improvement in your running when using our system, talk to us, as we may have to revise your plan.

**B-alance** - 'Everything in moderation, and moderation in everything' is true in running. The best way to accomplish the most with your running, is ironically, to learn how valuable not running can be. You need rest: days off, easy days, active rest (cross-training), and sleep. Adaptation to mileage stress only occurs in the body during recovery after stress has been applied, so give your body a chance to recover! Never lose sight of the fact that running should be 'a part in the whole of your life, not the hole in a part of your life'. Do not let running consume you to the point where your family, friends, work and/or other interests suffer in its presence.

**E-njoyment** - Dr. George Sheehan said of running, 'It brings back the play we lost when we grew up...it restores those peak experiences, so rare for the adult, but everyday occurrences for the child.' Have fun with your running, realize its inherent potential for humor, and don't be afraid to laugh at it, or with others about it.

**L-ong-Term Focus** - 'Planning weekly is weakly planning'...you should look months, or years down your athletic road to realize your true potential. How are you going to reach a specific destiny if you're not sure what that destiny is? Always be aware of why you are training the way you are. Be purpose-driven...Have a goal, and have a plan to achieve it.

**I-intelligence** - The MDI motto is 'the mind leads the body'—we take pride in being 'academic athletes. Our training plan system blends years of training, coaching experience, running philosophy and sport science. It incorporates the training logic of some of North America's top running coaches, writers, athletes, and exercise physiologists--Bill Bowerman, Owen Anderson, Jeff Galloway, David Martin, Joe Henderson, Todd Williams and Jack Daniels. Ours is a rational, reasoned approach which recognizes the contribution of science to the art of training runners.

**E-nthusiasm** - The MDI corporate mission is to 'inspire people to bring out the best in themselves in body, mind and spirit'. If an athlete is not passionate about his/her dream, then even with the body toned, and the mind tuned, there cannot be true success. Our hearts must be intimately involved in our athletic endeavors to get the most out of our training, and to derive satisfaction and achievement from the process itself. Celebrate your efforts...no matter how you fare!

**V-ariety** – It's the spice of life, and the key to distance running success! Each 'type' of running in your plan provides variety, plus we take into account, 'crosstraining', considered the 'key' to overall total body fitness, and a way to accelerate your ability as a runner. As such, MDI emphasizes aerobic and strength cross training for improvement.

**E-xcitement** - Though people begin running for many reasons other than competition--weight loss, stress management, and health improvement among them--eventually most runners do attempt a race. Races represent a challenge of yourself, to yourself, and by yourself (and the occasional contest with others). The race against oneself, though, is the toughest race of all. You will never know an opponent so well, nor will you be so evenly matched, as with yourself. This is when running can be its most exciting, and why MDI recommends using races as a testing ground of one's improvement. A race will elevate your performance to its highest level, plus offer a context to share your effort among other like-minded individuals.

## The Training Triangle

Think of your plan as a triangle with three 'stages' stacked in a pyramid shape -- a base, a midsection, and a peak. Each stage has a distinct function, and builds upon the stage preceding it. Here are the stages in detail:

**1. ENDURANCE PHASE** (or Base Phase) - The primary objective in this stage is to increase your mileage, having more running time, not more running intensity. Fifty percent of your training will be in this phase. As such, in no other training phase does your mileage increase as rapidly (and yet never more than between 10% and 12% on average, usually well below the oft-prescribed '10%' rule of thumb). Also, though increased speed is not the focus of this phase, and though you will see your most dramatic increases in pace in later stages, you will become a marginally faster runner, almost despite your efforts not to focus on running speed. Here's why. Physiologically, the endurance phase accomplishes many functions, which loosely termed, improve your body's 'plumbing' for distance running. In case you're interested in the specifics, they are as follows:

- it increases the number and size of the **mitochondria** ('power packs' in muscle cells) where aerobic metabolism happens, leading to more muscle energy
- it increases the number of the **capillaries** (small blood vessels which bring blood to individual cells) so muscles get more oxygen faster, leading to more muscle energy
- it increases the amount of **myoglobin** (takes oxygen in blood from the capillaries to the mitochondria in muscle cells), leading to more muscle energy
- it creates more **aerobic enzymes** (which speed up aerobic energy production) in the mitochondria, leading to more muscle energy

All this means is that a period of uninterrupted base training makes your body a much more efficient aerobic mechanism, and prepares it for the intensity-oriented demands you will place upon it in the later phases. The primary run 'types' used in the Endurance Phase are Long Slow Distance runs, Ordinary Mortal Pace runs and Tempo runs. See the Glossary of Terms for more specific definitions of these run types.

**2. STRENGTH PHASE** (or Transition Phase) - the main goal of this stage is to prepare your body for the strain of faster running, both cardiovascularly and muscular-skeletally, without introducing a high degree of injury risk. This phase makes up 15-25% of your training using 'anaerobic' training (leaves you gasping for O<sub>2</sub>) and strengthens muscles with low injury risk. As such, there is a split emphasis: a modest increase in intensity, with a modest decrease in the rate at which you add mileage. This is a 'fun' phase, owing to the greater variety of run types used, and it is the shortest of

the three stages of your training triangle. In addition to the types of running used in the Endurance Phase, your running speed is safely increased in this stage through the addition of Hill Work, Fartlek running and Strides. These are 'gentle' forms of higher intensity running which provide the following benefits:

- build **functional strength** in the main driving muscles--quadriceps, calves, ankles
- **streamline your biomechanics**
- teach **pace variation**
- introduce your body to its **anaerobic threshold**
- improves your **mental toughness** (i.e. ability to tolerate discomfort)
- relatively **low risk of** muscular or impact trauma **injury**

Please consult the Training Plan Glossary for more detailed information on the additional types of running used in your Strength or Transition Phase.

**3. SPEED PHASE** (or Peak Phase) - this is the higher risk, higher reward section of your training plan comprising 25-35% of your training. You will enjoy your most significant gains in running speed during this cycle, but also open yourself up to the potential for impact trauma and overuse injuries, if you do any more training than is prescribed. When your running intensity is being pushed up by the concentrated cycle of 'Interval' running sessions (where you improve your 'lactate threshold', Max VO<sub>2</sub> and biomechanics) and the Tempo runs, your training frequency and duration (i.e. mileage) should stay constant or decrease. This reduces the likelihood of injury, and keeps you well rested between the 'peak' efforts being demanded on your body. No matter if your goal distance is 5K, 10K, 1/2 Marathon, or Marathon, you will be following tailored interval workouts that focus specifically on the speed requirements of your target distance. Please refer to the Training Plan Glossary for explanation of the various Max VO<sub>2</sub>, Race pacework, Running Economy and Tempo workouts. Listed below are the primary reasons to engage in 'speedwork':

- allows **faster running before building up lactic acid** (a by-product of muscle energy produced anaerobically, or without oxygen)
- allows **faster running in the presence of lactic acid** -- i.e. facilitates running beyond the lactate threshold
- improves running co-ordination and **biomechanical efficiency**
- **adds variety** to the training mix by breaking up monotonous steady state or long, slow distance running
- **psychologically toughens**, and increases self-confidence
- provides a competitive advantage in racing by providing **tactical flexibility**

Speedwork is the most demanding of all your training phases, but is also the most satisfying. You will gain physically in speed, mentally in focus and spiritually in pride and accomplishment. No matter what your ultimate race goal is, this plan is designed to improve your running, to take you to a new level of accomplishment.

Your familiarization with the Marathon Dynamics Training Plan principles, philosophy, and structure is now complete! Review your plan and consult the Training Plan Glossary for explanations and examples as needed. If you have any questions about your plan (after you've read this support material), please contact your MDI coach at the following numbers respectively:

**Kevin Smith: Ph (905) 891-3197 Fx (905) 271-7311      kevinsmith@marathondynamics.com**

## MDI Training Plan GLOSSARY of TERMS

### **ENDURANCE/BASE PHASE:**

**WU & CD:** Warmup and cooldown. Used in all phases of plans. A 'must' if doing any tempo, hill or speed work.

**AEROBIC CROSS (X) TRAINING:** Cross-training helps to 'multiply' the cardiovascular benefits being developed by running mileage in all phases. It **complements running** by strengthening connecting muscles, reducing the risk of injury, maintaining fitness when injured, and balancing strength in your body.

It **provides mental and physical variety, full body fitness, and a full range of aerobic intensity**, making it ideal for every runner. We recommend 'aerobic' cross-training activities such as cycling, in-line skating, swimming, water running, X-country skiing, stair-climbing and even walking, over non-aerobic activities (like weight training, tennis & darts) because they complement running so much.

**STRENGTH TRAINING:** A regular regimen of weight training or other strengthening exercises will build both upper-body and lower body strength and create muscle balance. If you have 1 extra 'optional' cross-training day, do some 'strength' training. If you cannot or will not do actual weightlifting, then develop a body-strengthening regimen at home of sit-ups (crunches), push-ups, pull-ups, curls, knee bends, lunges, heel-lifts, etc... that you can do say, twice a week (takes about 15 min.). For suggestions, see '4 Keys...' section, or talk to MDI coaches about specific exercises and weight workouts.

### **COMPARING RUNNING TO OTHER SPORTS:**

MDI plans provide a system to translate your aerobic cross-training time and intensity into an equivalent unit of running mileage called '**alternate value**'--which you can use to figure out how much a given X-training workout is 'worth' in running miles ... a useful tool to both forecast how much cross-training to do, and to figure out how much cross-training you've done.

**If you do not own a heart rate monitor**, then please consult the table provided in the Equivalent Mileage description located in the 'You & Your Training Log' section of this glossary, to find out how to roughly convert various forms of cross-training. Talk to the MDI coaching staff about developing equivalency values for any particular cross-training activities you do that are not covered.

**If you do own a heart rate monitor**, consult the HR Equivalency Charts (first page of each phase in your plan) and accompanying memo (last page of text before your actual training plan), to find out how to calculate the value of specific cross-training activities performed at particular intensities. This lets you 'give yourself credit' depending on the frequency, duration and intensity of

your cross-training efforts on a daily and weekly basis compared with our recommendations.

Please note: if you do more or less X-training time, or more or less X-training intensity, on a given day than your program recommends, simply use the HR Equivalency Chart to determine how much your actual workout was worth.

**Example:** If your plan asked for 36:15 of easy intensity X-T at an HR of 152, but you ended up doing 40:00 at a HR of 146, simply consult your MHR Chart to see what 'running pace' a 145 HR intensity is equal to (say, 9:30/mile) and divide the total time you worked out for by this pace (i.e. 40:00/9:30), for a total workout value of 4.2 miles. These are 'alternate' miles, however, not to be RUN, nor added to your total running distance.

**EASY FARTLEK:** Some training plans include fartlek ('speedplay') running in the endurance phase. This type is usually used in only strength and speed phases, but for those doing intermediate to advanced mileage, easy intensity fartlek running is a great variation to the recovery run that would normally be done. Easy fartlek running requires that **short bursts of 'faster' running** comprise no more than 30% of the entire running time, and the slower 'recovery' phases make up at least 70% of the run.

To do this you can **use a 2:1 or 3:1 easy/hard ratio**, always beginning and ending the workout with easy running (i.e. 2/3 minutes easy running, 1 minute hard running, then repeat). During the 'faster' portions, the intensity should never reach more than tempo to 10K race pace (approx. 85%-92% maximum heart rate), while on the 'slower' portions, the intensity should be easy LSD run pace (approx 70%-75% maximum heart rate) or even slower. Above all, make sure that the run leaves you feeling refreshed, not fatigued. If you are tired after an easy fartlek session, you've pushed too hard. If you went hard yesterday or are going hard tomorrow, you have to keep your intensity subdued.

**LONG SLOW DISTANCE (LSD):** This running is done only once a week, and is longer than any other run you do. Though the intensity is kept relaxed (always between 70% and 77% of your maximum heart rate), it is still classified as a 'hard' effort because it's long. It should never be scheduled back to back with another hard run in your weekly training.

LSD runs are usually **done at a pace roughly 1.5 to 2.5 minutes slower than your 10K race pace**. A more subjective guideline would be 'a pace at which you can converse easily and at length while running'. Since LSD runs can be between 30-45% of your entire week's mileage, it's good to schedule at least one rest day either before and/or after your LSD run (allow for even two days rest for some of your longest LSD runs).

Your ideal LSD run pace is printed at the bottom of every LSD run box as a guide to effort level. You do not have to run at exactly this pace to achieve LSD running benefits -- you can run a bit faster or a bit slower (use

the 'ranges' in your MHR Equivalency Chart). This range accommodates doing your long run with others, which we strongly recommend. To determine how accurately you are running your LSD pace, you have three options: measure the run course, use a heart rate monitor, or do the talk test. Once confident that you can run your LSD at proper pace, as with O.M.P. runs, we suggest you run a variety of courses, unmeasured, using total time and/or HRM as your guide.

**MARA-PACE (OR ½ MARA-PACE) RUNS:** Every 3rd or 4th week (only in Marathon and Half-Marathon training plans, not 5K or 10K), you will see a long run that is different from the 'regular' weekly LSD run. This workout is designed to give you a true feel for the intensity/pace at which you will be running your goal event at. Do about 1/2 of the recommended WU/CD (warmup/cooldown) distance at your normal LSD pace or easier, then either right away, or after a short walk/stretch recovery, launch into the recommended 'race-pace or ½ race-pace'. When that is complete, follow it up with the remainder of the WU/CD distance, and the workout is done.

Many MDI clients have found this an excellent way to see if they are on target for their race goal.

**MANDATORY REST DAYS:** All MDI training plans have **at least one or two mandatory rest days--no running, no cross-training, no anything** (breathing, working and eating only). All your hard work on the other days will not translate into improved fitness if you don't allow your body time to 'rebuild itself' for the next round of training. Do not undermine your (and our) work by training, even easily, on your scheduled rest days. In the final or speed phase, you may have 2 rest days so take them. Faster runs and more mileage takes its toll so give yourself recovery time on all stated 'rest' days.

**RECOVERY RUNS:** Runners training at higher mileage do not get the 'luxury' of as many days off per week as their lower mileage counterparts, and as such, must run on one of their rest days. That is all these runs are meant to be: **'running rest'**. These runs are usually shorter than most other workouts in the week, and must be **done at a low intensity (i.e. approx. 70-75% maximum heart rate)**. If done at a slow pace, these runs can function as rest to the trained body of a higher mileage runner. Some experienced runners err in running too hard on these scheduled easy run days. They need to force themselves, even to the point of discomfort, to maintain a very easy pace.

**ORDINARY MORTAL PACE (OMP):** Also called 'steady state', this running is done at about **1-1.5 minutes per mile slower than your current 10K racing pace** (as stated on each page of your plan). Your pace for this is at the bottom of every OMP run workout box. This is a running pace a little slower than the speed at which lactic acid (a metabolic byproduct of energy production) begins to accumulate in your muscles (this point is called your lactate threshold). As such, **OMP runs should feel 'comfortably hard'**. They are classified as a 'hard' effort for the body, and as such

we try not to schedule them back to back with another 'hard' effort in your plans (though it can't always be helped). Here are 3 ways to **get the feel of your OMP** run pace--two are objective, the other more subjective.

First, you can actually measure an out and back course of the scheduled distance of your next OMP run with a car odometer. Mark a few splits (i.e. 1 mile, 2 mile, 1/2 way, etc.) along the way, so that you can check your pace when you run. Go and run the course once, paying attention to your splits, and try to stay close to your target pace. Once you've done this once or twice, and believe you have a good 'internal pace clock' for OMP running, make a new route. We encourage clients not to run the same course very often (get variety), so that they don't turn each OMP run into a competition and feel more stress and pressure to go faster than last time.

Trust your pace judgment, and run by time rather than specific distance. For example, if your schedule says to do 5 miles at a 9:12/mile pace then just go out and run at your 'internal OMP pace' for 5x9:12= 46:00.

Second, if you own or have access to a heart rate monitor, OMP running is performed at **between 78% to 85% of your maximum heart rate** (depending on runner's speed). Do a run or two at that intensity to internalize the pace meter, then keep running with a monitor or not.

Third, if you don't care about distance and splits or don't have access to a heart rate monitor, a good subjective guide to your natural OMP is the speed at which you can **speak in stilted, but not comfortable, conversation while running** (best done with a partner to test this out or you'll look strange).

**STRIDES:** Designed to get your HR up, your circulation up and your mind prepped for speed, These are simply **100-120-meter gradual accelerations, done in sets of 3-6 repetitions, usually before doing speedwork or after easy paced runs**. Begin each stride running easily, then every 30 meters or so, smoothly accelerate one gear, to a point just before finishing where you are at 90%-95% effort. Jog easily to recover between stride repetitions.

**TEMPO:** This is the only challenging type of speed you do in your endurance phase. You only do it **once a week**, and keep it to 15% or less of your total weekly mileage (to limit both the injury potential and the mental stress of harder running). **It is not a speed, race or time trial** (all that comes later), so please do not treat it as such. It is simply a **short segment of higher intensity running (84%-89% of MHR)** to give your week variety, and to keep your legs from getting too used to other types of running in the endurance phase.

If looking for a subjective guide as to what an suitable tempo run speed is, it can be **the pace at which you could race 15K (or maybe 10 miles)**. A tempo run should be done as follows: split the indicated warm-up and cool-down (WU&CD) total distance in half on either side of your scheduled tempo run distance. Do the WU&CD running at LSD run pace or even slower. Your tempo section should be done, at least occasionally, on a measured course as close to the indicated distance in your plan as possible. The pace of the tempo run is

provided for you in the workout box so try to stay close to that pace.

**CRUISE TEMPO:** Every second week in the endurance phase your 'speed day' alternates 'continuous' (or normal) tempo running with 'cruise tempo'. The only difference is that with cruise tempo, you try to take short 60-second breaks in the middle of normal tempo pace running, every 10 minutes or so--otherwise, it's just like the tempo running described above. It gives your body (and mind) a break and gives a slight recovery before carrying on with the lactic acid building pace. The net result is that you often get a longer duration of total running time at cruise tempo pace.

### **STRENGTH PHASE:**

**HARD FARTLEK:** Similar to easy fartlek, described in the endurance/base phase glossary, the only significant difference is that the **hard/easy ratio is reduced**.

Instead of the 2:1 easy-to-hard relationship given for easy fartlek, hard fartlek workouts **use between a 1:1 and a 1:2 easy-to-hard ratio**. The shorter rest cycle changes the workout from 'easy' to 'hard' effort. The hard-easy rule still applies -- so don't do another 'hard' workout the day before or after this workout.

**HILL WORK:** Done to build muscle strength in the quads and calves and to prepare you for the speed phase later. What to do? Find a relatively long (200-250 meters), modestly steep hill or hill circuit (9 to 12 degree gradient) Rule of thumb selecting a hill?... look at it from below and say "Oh, oh, don't like this"... then you know it's got the right pitch. Divide the total number of WU&CD miles by two, and run that distance as an easy warm-up. After light stretching, begin your hill repeats.

**Run up the hill at approx. 90% effort-- not an outright sprint -- for approx. the duration indicated in the 'Time' box of your plan** (use a familiar landmark as a reference so you run the same distance each time). Slow to a walk, catch your breath, then very easily jog down the hill to the bottom, checking at the base of the hill that your heart rate has dropped back down to 120 bpm (or less depending on your max HR), to ensure recovery between sets. Repeat this process with as many 'uphills' as your plan indicates.

**Concentrate on form as you ascend the hill, and on recovery as you descend.** Once all reps are completed, do the second half of your WU&CD scheduled miles.

**Whatever the mind can conceive and believe,  
The mind can achieve.  
Napoleon Hill**

### **SPEED/PEAKING PHASE:**

**MAX VO2 INTERVALS:** Intervals are the key to faster running. By forcing your body to '**get comfortable**' with **the greater stress and demands of running speeds at or faster than your race paces, you will, over time, run faster**. The key is to do this without burning out or injuring oneself. All MAX VO2 workouts in the speed phase of all programs--5K through to marathon--are designed to accomplish this.

**Example:** this is to get you familiar with the jargon used throughout our training plans (we figured times out for you too so don't worry about what pace to do):

4 x 800m @ 5% faster than 5K target race pace	
2 miles WU&CD + strides	
4 miles = Total workout mileage	
Repeat Time	4:02
Rest Interval	3:01
Target HR	187

This is simply saying to do four 800m repeats at 4:02 each (a pace exactly 5% faster than current 5K race pace), with a 3:01 rest (i.e. walking/jogging) break in between the repetitions. HR should peak, near/at the end of each rep at around 187 bpm (beats per minute), but may vary significantly from repetition to repetition

Do 2 miles in total warming up and cooling down and include a set of 'strides' (see definition) during the warm up before starting the 800s. Total mileage for the workout equals 4 miles.

**RUNNING ECONOMY REPITIONS:** The other type of speed work advocated in most plans are "running economy reps". These are shorter, faster, spurts of hard running with much more recovery time allowed between repetitions. These workouts teach the body (muscles, nerves, etc) to run at a given speed with less energy then before, or alternately (and in most cases preferred), at a higher speed with the same energy expenditure. Your body learns (or more aptly put, "teaches itself") how to eliminate unnecessary arm and leg movement, when to generate force and when to relax, and which motor units to recruit for running at or above race pace. In short—you will feel more comfortable with faster running through these workouts.

## **DETAILS ABOUT THE PLAN & LOG**

Please review the sample MDI Training Plan/Log Sheet. As you can see, the 'plan' portion is integrated with the 'log' or 'actual' portion. This lets you compare what was planned with what actually happened. **Note the 'plan' side:** each day's workout is itemized by time, distance, and intensity so you know what to do each day. **Note the 'actual' side:** review what you should enter in your log. **Keep your log records up to date and accurate** so that you and your MDI coach, can, if necessary, track your progress and analyze your running records. It could help your performance.

**Under COMMENTS:** In this location, note **exactly how you felt for that session**. Include anything unusual--good or bad, any aches and pains, weather conditions, or odd circumstances as well (i.e. ran late at night, with a new running partner, etc...). Please also see the **'Notes'** section above your weekly log--at the beginning of each week, note how your training is progressing. **Address any trends, curious results, injury status, or achievement of 'extras'** (see below) from your last week of training, or even how you feel about the upcoming week of training!

**EXTRAS, EXTRAS (read all about it):** These boxes, located along the far right side of each day's training (numbered 1,2,3), are the variables you can track along with your running. By entering a checkmark, an 'X', a yes/no, or a numerical value in these boxes, you can keep accurate long-term records of those **three 'training related' variables you believe may have an effect on your training**. At the end of the week, add up your totals on each variable, just like you do with your running mileage and your alternate mileage. Over time, these 'extras' may provide clues to your performance.

**'SPECS':** This is a short form for 'specifics'. **Details such as distance, time, target and average heart rate, and pace are the 'specs' of any workout**. Record these in the space provided in your training log.

**ALTERNATE VALUE 'MILEAGE':** This is how MDI assigns **value to the aerobic cross-training activities you do to supplement your running**. It allows you to quantify your cross training activity, and equate it to running in miles or kilometers. The chart below illustrates the 'A' value (alternate running miles value) of a few aerobic cross training activities that you can use if you don't regularly use a Heart Rate Monitor. If you do other aerobic activities not listed here, then please contact your MDI coach and we can help to determine an 'A' value for your activity. If you use an HRM when aerobic cross training, then we suggest that you use your MHR Equivalency Chart to gauge and record all your cross training (see the memo provided with your chart):

<b>ACTIVITY</b>	<b>AMOUNT OF ACTIVITY</b>	<b>'A' VALUE</b>
<b>CYCLING/SPINNING</b>	<b>3 miles</b>	<b>= 1 A mile running</b>
<b>IN-LINE SKATING</b>	<b>2 miles</b>	<b>= 1 A mile running</b>
<b>WATER RUNNING</b>	<b>1 min strong</b>	<b>= 1 A min of easy OMP running</b>
<b>X-COUNTRY SKIING</b>	<b>1 min steady</b>	<b>= 1 A min of steady OMP running</b>
<b>STAIR CLIMBING</b>	<b>1 min steady</b>	<b>= 1 A min of easy OMP running</b>

MDI training plans prescribe between 10% & 50% as much 'alternate' mileage as 'actual' running mileage, depending on the phase of training and experience of the runner. **If 'aerobic' cross training** is one of your regular activities, you will significantly improve your success potential in racing.

Sample Page...

Go Ahead

**MARATHON DYNAMICS TRAINING PLAN & LOG SYSTEM**

Name	Jane Moser	Sex--M/F:	F	Sample Page
Test Wk 1-Mi	07:00	Abilt Bias:-Spd/Str/End:	STR	Age: 40
Test Wk Vol.	16	MLS OR KMS	MLS	Goal: OTTAWA HALF MARATHON!
Test Max HR	190	Aero.XT-hi/med/lo/no:	LO	Date: 30-May-04
Current Wt:	150	Start date of test wk:	17-Jan-00	17 Weeks to go...LET'S BEGIN!

Experience Level: 0 - 5	From: 17-Jan-00	TIME PROJECTIONS	TO: 23-Jan-00	Notes: how is my training going?
0	% MHR = 80%	EST. 1/2 MARATHON 1:54:38		
Equiv. 1/2 1:55:13		EQUIVALENT 10K TIME		
Equiv. 10K 0:50:18	% MHR = 89%	0:50:03		
Equiv 1 Mile 07:02	% MHR = 94%	EQUIVALENT 1 MILE 07:00		
WEEK 1			Extras	1 Healthy Eating: YES/NO?
Day of The week			Key:	2 Stretching: YES/NO?
				3 Strength Work: YES/NO?

Day of The week	THE PLAN			THE ACTUAL			Extras
	SPECS	THE #'S	COMMENTS	SPECS	THE #'S	COMMENTS	

MONDAY	Distance	0	Phew,	Distance			1
	Time	0:00:00	Take the day	Time			2
	Trgt HR	-	Completely off	AVG HR			3

TUESDAY*	Distance	2	Tempo run	Distance			1
		1	W.U. & C.D. before & after				2
		3	Total distance				3
Intensity	Time	0:16:50	Remember to sandwich	Time			
Day!	Trgt HR	167	Tempo work between	AVG HR			
	Pace	08:25	The warmup & cooldown	Pace			

WEDNESDAY	Value	3	Aerobic X-training	Distance			1
	Time	0:30:13	Easy Alternate activity...	Time			2
	Trgt HR	138	...no running	AVG HR			3

*THURSDAY*	Distance	4	"O.M.P." Run:	Distance			1
	Time	0:35:45	Do the second half	Time			2
	Trgt HR	158	Slightly quicker than	AVG HR			3
O.M.P.	Pace	08:56	The first half	Pace			
Day!							

FRIDAY	Distance	3	Easy Fartlek Run:	Distance			1
	Time	0:28:12	1 min hard (10k pace)	Time			2
	Net HR	150	2 min easy (LSD), repeat.	AVG HR			3
	Net Pace	09:24	Concentrate on form	Net Pace			

SATURDAY	Value	0	Aerobic X-training	Distance			1
	Time	0:00:00	Extra rest day...	Time			2
	Trgt HR	0	Too busy to train!	AVG HR			3

*SUNDAY*	Distance	6	Long, slow distance run	Distance			1
	Time	0:59:30	Relax & enjoy the run!	Time			2
	Trgt HR	142	Remember to do strides	AVG HR			3
LSD Day!	Pace	09:55	At the end though.	Pace			
				Temp.			

WEEK 1	THE #'S	17-Jan-00	PLAN TOTALS	THE #'S	23-Jan-00	ACTUAL TOTALS	Extras
THE MIND	16	MLS	RUNNING DISTANCE		MLS	RUNNING DISTANCE	
LEADS	3	MLS	ALTERNATE VALUE		MLS	ALTERNATE VALUE	
THE BODY!	19	MLS	CUMULATIVE DISTANCE		MLS	CUMULATIVE DISTANCE	



## ‘CAVEAT RUNTOIRE’— 6 FACTORS TO FACTOR IN

1. **HEART RATE FACTORS:** Of all the information in your plan, target heart rates (HR) are the least accurate. This is a result of:
  - a) the heart rate monitor’s accuracy in providing your true maximum HR exactly at the end of your test;
  - b) whether or not you paced yourself during your mile trial such that you ‘maxed-out’ at the very end of the test;
  - c) on any given training day, your heart rate during a workout can be affected by your relative hydration or energy level, stress level before run (from work, family, life, etc...) or during the run (traffic, cramps, etc...), amount of sleep the night before, fatigue from previous workout (day before, or even two days before), terrain (‘hilliness’, surface), weather factors (wind, snow, temperature, humidity), and many other reasons.

As such, it is important not to draw firm conclusions from any one workout, but to wait until you have a record of several weeks of training before using heart rate data with much certainty. **Please allow at least 5 to 10 bpm (beats per minute) variance from the target HR prescribed in your plan.** Until you know the training plan has reliably captured your heart rate intensities, **focus more on doing workouts as per the times, paces and distances given** to ensure your progress. Remember that the target HR for any run is an ‘average’. It takes most runners the first 5-10 minutes of a run to get their heart rate up to the target average, which means that for the rest of the run (i.e. most of it), your HR must be above the given target (i.e. 3-5 beats) to pull the actual average up to the target average for the total time of the run. If your HR monitor does NOT have an ‘average’ HR function, **try to keep your HR at least 3 to 5 beats above the target average for most of the run** or you’re staying in too low a range.

2. **THE FITNESS FACTOR:** When starting a plan, especially after some downtime from regular running, most people find that even when following the workout guidelines for distance and pace accurately, their average heart rates are up 10-15 beats above their target HR. Don’t worry about this, just continue to follow the time, pace and distance guidelines, and continue to record the actual (or estimated) average heart rates for your workouts. Over time (i.e. 3-4 weeks to 2-3 months) your average heart rates will slowly trend toward the target HRs in your plan (or at least that the variance between the target and the actual will decrease). This is the ‘fitness factor’--through proper and regular training, your body will become more efficient, and be able to do workouts it couldn’t have accomplished at the start of the plan--especially if starting from scratch or after a break from running.

3. **UNCOMMON SENSE FACTOR:** If at any time you feel (body) or think (mind) that your training plan is overtaxing (or less frequently, undertaxing) you, or that a given workout, or week of workouts, seems too hard (or too easy), please contact your MDI programmer immediately, as it may be time for some unplanned rest to prevent ‘overtraining’. We can also adjust your plan if need be. You know your body best so trust your instincts when something doesn’t ‘feel’ right. Don’t assume you must follow your training plan ‘no matter what’... we would have etched out your program in stone if that was the case!

**It is well, when one is judging a runner, to remember that he or she is judging you with the same godlike and superior impartiality!**

4. **RUN/WALK RECOMMENDATIONS (Marathon & 1/2 Marathon training plans only):** If your current week’s forecast time for a marathon is over 3hrs56min (or over 1hr58min for a 1/2 marathon) you will note that your LSD (long) runs are in a run/walk format. It is our feeling, and that of countless running experts and exercise physiologists, that **until one can reasonably expect to complete these distances in these times or faster, a higher probability of successful completion, and of a faster finishing time will result from the run/walk approach.** It is not mandatory to follow our suggestion to run/walk, and as such, the information is provided so that you can choose to run a continuous pace without any walking breaks if you so desire.

**If you follow our run/walk recommendation, read the workout as follows:** Run easily for approximately the time indicated on the third line of the ‘text’ box of your LSD workout, then take about a 1-minute walk break (still a brisk but comfortable walk pace) then repeat the cycle--again and again, as required. NOTE: no matter if your plan is in MLS (miles) or KMS (kilometers), run for the time given, follow it with one minute of walk recovery, then repeat.

If you use this method, your 'net pace', or the approximate speed you will average is given beside the 'specs' pace box of your LSD run (usually about 30 seconds slower per mile, or 20 seconds slower per km than the pace you are running at).

**If you want to forego the run/walk approach**, and run continuously, then simply run at the pace given beside the 'specs' pace box of your LSD workout, and ignore the pace guideline given on the third line of the 'text' box.

5. **CALORIE BURN INFORMATION (Marathon training plans only) or, BONK is a 4-letter word:** It is critical to your marathon success to have enough calories of energy for a runner of your weight traveling at your speed to complete the full distance without glycogen depletion, or 'running out of gas'. Plus, it's good to know how many calories you'll need to take in during your regular long runs to prevent this from happening in training. Use weekly long runs to 'accustomize' your body (mainly digestive system) to take in enough calories as needed. As such, we added a function to all marathon plans which calculates for each of your weekly long runs the following:

- the optimal **frequency (i.e. how often) you should take in 100 calories** during your long runs is provided on the second last line (if you 'carbo-loaded' in the day or two prior to the run) and the last line (if you didn't carbo-load prior) of the workout description. For these purposes, carbo-loading can be defined as having had at least 2 high carbohydrate meals in the 48 hours before your run (i.e. pasta, rice, potatoes, breads, fruits, veggies, etc.).
- The optimal **number of (i.e. how many) 100 cal. servings**—roughly a PowerGel or large cup of Gatorade—that you should use for the entire long run is provided in the "Day of Week" box. **An "E" is defined as one 100 cal serving**, thus "E's 2 use if C/L (carbo-loaded)" and "E's 2 use if not" define how many calorie servings to use—either to ensure you don't 'bonk', and/or (more likely) to begin accustomizing to the number/frequency of servings it will require to get through the entire race distance without risking the dreaded "bonk".
- Note: for Marapace runs, there isn't a 'no carbo-load' option, as we assume you will treat the workout like a race, and ensure you are 'race ready'. As such, all the required calorie info (serving frequency and number) is provided in the 'Day of Week' box.

**\* NOTE: No single action you take on/before race day can have as much negative effect on your ability to reach your forecasted marathon time than underfueling your body.** If you don't eat enough, you will 'bonk' and be forced to slow down, stop, and maybe even drop out of your race.

5. **REALITY FACTOR:** Life doesn't always work out like we plan it, and similarly, neither does running. Relax! Your MDI training plan was created with 'leeway for life' built in. In other words, you don't have to do all the training indicated in your plan (i.e. all the workouts, every week, exactly to the letter) to get close to hitting your target goal time. Even if you do about 90% of the plan's volume and intensity, you can still expect to hit or come very close to the original race time forecast provided. We have provided (or will provide with the final phase of your plan) a very useful race time and split forecasting worksheet, which will allow you to monitor your pace very closely throughout your race, to achieve your optimal result on race day. If, however your training in the weeks and/or months prior to your event day has been less than ideal (i.e. you performed less than 90% of the plan's volume/intensity), then use the following guidelines to adjust your race day time expectations accordingly, as you prepare for your event:

- a) if you've run 90+% of total target volume/intensity.....shoot for the time goal indicated in your plan  
 b) if you've run 80-89% of total target volume/intensity... add 5% to the prescribed time goal  
 c) if you've run 70-79% of total target volume/intensity... add 10% to the prescribed time goal  
 d) if you've run less than 70% of target volume/intensity... reduce the distance of the goal event

Example: A person training for a marathon with a forecast time of 4:10:00 would figure out the week before their race that they did about 85% of the mileage & intensity their plan indicated. They should add 5% to the time forecast (i.e. 4hrs10min, or 250min x .05 = 12:30) for a new target time of 4:22:30. Call your MDI programmer if your calculator is broken.

**A friend is a person who has heard all your running stories six times, but likes you anyway.**

## The Max Heart Rate (MHR) Equivalency Chart

**Make your training more accurate, appropriate, and useful** using the data on your MHR Equivalency Charts (see tabs at bottom left hand corner of your Excel screen in your plan phases marked with "MHR"). The table in the lower half of the chart generates valuable physiological information based on your theoretical and tested max heart rates and the results of your recent '1-mile' test. This chart correlates key percentages of your MHR (i.e. 85%) with exactly what your HR should be at that percentage (i.e. 154) in beats/minute, with exactly what your running pace should be at that percentage (i.e. 7:36/mile). This lets you:

### 1) Pace & Measure Your Runs:

**a) If you own an HRM (heart rate monitor)**, you'll never have to 'measure' a running route again! Simply go out and run and keep your average heart rate at the specified level or range for the total time indicated for that run. For example, if you have to do an OMP run of 4 miles at a pace of 8:05, you know that you must run for approximately 32:20 (8:05x4). You also know from your chart that you should keep your heart rate between, say, 81%-85% of your maximum. Just turn your monitor on, run wherever you like, and keep tabs on your time and HR readings.

**b) If you don't own an HRM**, you have two options. Borrow one or rent one from an HRM retailer and run a few routes using the method above. You'll accomplish two objectives: you'll develop a 'feel' for the right pace for specific types of runs by using the monitor as your guide, and you'll get informal but fairly accurate measurements of a few of your favorite courses (by dividing the total time running by the estimated pace/mile you ran at).

**c) If you don't want to rent or borrow an HR monitor** but still want to use this information, just measure a few running routes out, and do the required distances at the required paces provided in your program. If you did the initial 1-mile test, you can be sure that you're at the proper HR intensity by running the pace in your program for your run. It's that simple!

### 2) Measure the Value of Aerobic Cross Training:

**a) If you own a heart rate monitor**, now you can do any non-running aerobic activity, find out how the workout equates to a running workout, and record it as such in your training log. For example, if you decide to do some 'easy' cycling or lifecycling on a non-running, cross training day and want to know how hard to go, check your HR target indicated for that x-training w/o (i.e. 132), strap your monitor on,

and go to it. When you finish, take your total time of cycling/lifecycling (i.e. 60 minutes) and divide it by the running pace (i.e. 8:32/mile) that your average heart rate (i.e. 132) corresponds to (from the MHR chart). So, 60 minutes/8:32 per mile = approx. 7 'A' (or alternate) miles.

**b) If you don't own a heart rate monitor**, then as above, borrow or rent one for a short time to test out your favorite cross-training activities' heart rate intensities. Run the math on a few workouts, get comfortable with your average HR in those activities, and return the monitor. Go on 'perceived effort' level from then on (or until you invest in an HRM). At the very least, use the equivalent activity chart in the Cross training section of the Glossary to measure the value of your non-running aerobic activity.

### Notes:

**1) Ranges around the "ideal" pace for Tempo, OMP (steady state), and Long Slow Distance runs are provided for a reason.** On any given day you may feel better or worse than the next or last day, so give yourself some leeway. The 'fast' and 'slow' parameters indicate acceptable intensities to do the stated workout at, so any day that you are feeling better or worse than 'ideal', listen to your body and pick it up or slow it down accordingly. Try, if possible, to keep your pace within the appropriate range. It can be difficult, though not impossible, on any given day to have all 3 measurements -- pace, distance, and HR-- hit target exactly. On some runs (especially long runs) you may find your AVG HR up from 5 to 10 beats higher than target if you stay at the advised pace... this is acceptable. If the average HR variance is 10 beats per minute (bpm) or more (for 2 or more runs), then contact us as there may be a problem with the original assumption of what your MHR (or 1-mile speed) actually is.

**2) The data on your MHR chart correlates to your fitness at the time of your test only.** As you train, your body becomes more efficient at performing both running and cross training, so you get faster for any given HR as time goes on. This is important if training without a heart rate monitor, because you won't be adjusting your speed/intensity due to a heart rate monitor's feedback. As your training progresses, pay attention to the subtle increases in the speed of your different 'types' of running to ensure that you get an appropriate workout. In short, a 'tempo run' pace today may only be an OMP run in 6-7 weeks. Check the variance around a specific type of run (i.e. +/- 5 bpm for your OMP effort) on your chart, and then use that variance as a guideline for your target OMP range for all future runs.

## 4 'KEYS' TO EXCELLENT RUNNING

### BEST STRETCHES

**To improve running efficiency without hard work? Stretch properly & often...**

**HAMSTRINGS** –back straight, leg straight out about knee or quad high on bench, bend into the stretch.

**QUADRICEPS** - stand straight up with good posture, flick one foot behind, grab with hand, pull foot into butt 5 sec. (also resist pull by pushing out with foot for 5 sec.). Repeat twice.

**CALVES** – lean towards a wall, hands outstretched, feet flat, stretch *both* muscles of *both* calves... stretch gastrocs (keep leg straight), and soleus (bend at knee)...keep your heels on the ground.

**HIPS** - limber up your hip flexors and extensors using a "kneeling front lunge position" (as if canoeing) ...push hips forward slowly while holding head & shoulders back... always do lunges slowly.

**I.T. BANDS** – lie on back, bring one knee up & forward, pull knee to opposite side until you feel the stretch in your glutes & hips. Hold for 15 seconds. Repeat with other knee.

**STOMACH & BACK** - gentle, slow, large 'hula-hoop' rolls will loosen up these important stabilizing muscles for good running form

\*\* do 1-3 sets of each stretch (as req'd), hold each stretch for 20-30 seconds, breathe slow & deep

### BEST DRILLS

**To improve running strength & speed without fast running? Do plyometrics...**

(only do these after doing a warmup run)

**BOUNDING** - bound from 1 foot to the other, jumping for height & distance, not speed

**LEAPING** - take off and land on same foot, aim for height, then alternate to other foot

**HEEL or BUM KICKS** - bring heels up to your buttocks behind you in rapid succession

**HIGH KNEES** - bring your knees up to hip level in front of you in rapid succession

\*\* do 1-3 sets of each drill (as req'd), moving forward slowly 30-40 metres on each repetition

### BEST STRENGTH

**To improve your power, efficiency & reduce your injury-risk? Get stronger...**

(suitable for both men & women, whether fitness club member or not)

**SIT-UPS (crunches)** – (strengthens upper body) - lie on back, knees in air, legs bent, arms across chest, chin tucked in, raise shoulders off ground & hold 1 sec., relax back down...

**BACK FLEX** – (balances above sit-ups, strengthens lower back) – lie on stomach, arms down your sides (or for more resistance, out to your sides), raise your shoulders off floor 6-8", go back down...

**PUSH-UPS** - great for arms (triceps), chest (pectorals) shoulders (deltoids), back (latissimus dorsi) and abdomen... (for a beginner pushup, use knees –on all fours use knees to support body instead of toes...

**BICEP CURLS** - use light freeweights, stand or sit, isolate the muscle by bringing hand to shoulder (as in the running motion); only increase weight as motion gets too easy (don't run with weights).

**TOE RAISES** - stand on toes, push straight off floor using calves...improves power of ankle lever...

**LEG EXTENSIONS** - use leg extension machine at gym...don't use too heavy a weight.

**HAMSTRING CURLS** - use hamstring curl machine at gym... (use light weight)... or use ankle weights at home by alternating slow & fast lifts by doing a bum kick...

\*\* do 1-3 sets of each exercise (as desired), with at least 15-20 repetitions per set, per exercise

### BEST DIET

**To improve performance and speed your recovery? Fuel up intelligently...**

**ATHLETE'S BALANCED DIET** - try to eat a 60/20/20 blend of carbohydrates, protein and fats regularly.

**TAKE SUPPLEMENTS** - especially during intense or high volume training periods; use vitamin C and E (antioxidants to hasten recovery), Advil (for sore or stiff muscles and joints – epsom baths help too).

**FUEL WELL ON THE RUN** - take water, sport drinks and/or energy gels/bars during longer runs.

**REPLENISH QUICKLY** - always eat a high carbohydrate snack within 30 minutes of workouts for best energy replacement. Suggestions: Boost Sport drink, PowerBars, bagels, fruit, yogurt, pasta...

For more details on any of the above information, please contact the Marathon Dynamics coaching staff...

# RUNNING TIPS

## Pre-Run Tips

- a. Eat a light breakfast (such as you're used to taking) with water, 1-2 hours prior to run (could include banana, energy bar, toast, a half or whole bagel, etc. ... maybe hold off on the prune juice)
- b. Wear suitable running gear for the day (tights, long sleeve top, light gloves, hat, shorts, T-shirt, whatever)
- c. If meeting others for run, get there a few minutes early so you can find parking, relax, warm up, stretch, socialize, get one last swig of water, etc. (have an ID or contact card with you)
- d. Do your pre-run ritual if you have one (Vaseline toes & other areas to prevent friction & blisters, stretch, make sure you're color-coordinated!)
- e. Know what local stores/food shops might be open to use their washrooms if necessary
- f. Start your run slowly to get circulation going, to warm up muscles and to prepare you to run the pace you want... give yourself every chance for success!
- g. If doing the 'run-walk' method, walk for 5 minutes to warm up before doing your first run segment
- h. Stretch after your warm-up, but don't overdo it...
- i. Have water after your warm-up

## Tips to a Successful Run

1. Think positively... *you are a winner* every time you run...
2. Remember past achievements to boost your confidence
3. Concentrate, not on outcome, but on having fun with other runners, on enjoying yourself... the distance will fly by... especially important during blizzards
4. Focus on your form while running— assess each body area and relax it, or tell yourself to relax it, from head to toes
5. Deal with stress... little twinges of discomfort are common... don't give up... walk quickly for a bit if need be (do fitness walking... walking with a purpose), then resume running
6. Break your run into 1-km segments, or 5k segments or some other fraction of the total you're running so it doesn't seem so long
7. Drink from your water bottle every 15 minutes if out on a very hot day or for more than 1 hr.
8. Visualize yourself finishing strong, arms in air in victory (pretend you're in a race and you just won!)
9. Keep your time goal in mind... see it on the clock in your mind... but PACE yourself and keep to it unless feeling a bit off, then go with how you feel
10. Hook up with another runner during your run if possible and urge each other on, support each other
11. Even if feeling great, stay with your original plan for mileage. Add no more than 15% of that day's run if wanting a bit more distance. If following a plan of some sort, remember, it was set to gradually build your mileage, so don't try to do a week's worth in one run!

## Concerns during run

- Dry mouth, thirsty... in all the excitement of getting to your run, you might not have taken in enough water so ensure you get a good cupful at the water stations
- Stitch... slow your pace down briefly, massage rib area, breathe deeply
- Labored breathing... slow your pace down, or walk, do at least 3 long, slow deep breaths in and the same out... keep doing this until you are breathing normally again, then resume running
- Calf cramp... slow down briefly, or stop, and press the ball of your foot against the curb to stretch out calf
- Blisters... they can be uncomfortable but you can probably finish with them. Treat them right after run.
- Dizziness... slow down, walk, or stop if feeling light headed... sit down, resume movement if it clears or call for assistance if it gets worse

Even a RUN is about getting to the finish line so we can celebrate our accomplishment (even better if with others). It does not matter how fast you run... do not compare yourself to others... every time you run or race, you achieve something very SIGNIFICANT that touches your heart and soul. Believe that you're EXTRA-ordinary because you do this.

“Use running as a tool to reduce stress, learn more about yourself, learn your limits and fears and your greatness; to learn that you are much more than you thought you were, to think your own thoughts and lead your own life, to learn how to *live*.”  
 Dr. George Sheehan

## MY RUNNING GOALS THIS SEASON

RACE DISTANCE	ACCEPTABLE GOAL	CHALLENGING GOAL	ULTIMATE GOAL	REWARDS FOR ACHIEVING GOALS
5K				
10K				
1/2 MARATHON				
MARATHON				
OTHER				

## MY RACE LOG THIS SEASON

RACE DATE	RACE NAME	TIME	PACE	COMMENTS/CONDITIONS

**The only way to discover the limits of the possible is to go beyond, to the impossible.**  
- Arthur C. Clarke

### **DO NOT BURN YOURSELF OUT**

One final paragraph of advice: Do not burn yourselves out. Be as I am - a reluctant enthusiast, a part-time crusader, a half-hearted fanatic. Save the other of yourselves and your lives for pleasure and adventure. It is not enough to fight for the land: it is even more important to enjoy it. While you can. While it's still here. So get out there and hunt and fish and mess around with your friends, ramble out yonder and explore the forest, encounter the grizz, climb the mountains, bag the peaks, run the rivers, breathe deep of that yet sweet and lucid air, sit quietly for a while and contemplate the precious stillness, that lovely, mysterious and awesome space. Enjoy yourselves, keep your brain in your head and your head firmly attached to the body, active and alive, and I promise this much: I promise you this one sweet victory over our enemies, over those desk-bound people with their hearts in a safe deposit box and their eyes hypnotized by desk calculators, I promise you this:  
You will outlive the bastards.

Edward Abbey