ATHLETIC PERFORMANCE PROFILE

CLARK COLLEGE

Fitness Testing Lab

J. Sample, YOUR TRAINING HEART RATE ZONES ARE LISTED BELOW

The following heart rate zones were determined from your exercise test. Your heart rate and oxygen consumption level at threshold were used to construct each training zone specifically for you. These zones are a representation of your individual exercise capacity and unique metabolic response to exercise.

Heart rate zones	HR	Low HR	High HR	Kcal/hour	Fat Kcal/hour	Watts
Zone 1 (HR @ 80-85% LT)	124	117	124	864.6	166.8	192
Zone 2 (HR @ 90-95% LT)	139	131	139	1064.4	136.2	240
Zone 3 (HR @ LT)	146	140	146	1119.6	0	259
Zone 4 (HR @ 105% of Peak LT)	153	146	153	1233	0	291
Zone 5 (Peak effort)	173	155	173	1375.2	0	358
Zone 6 (Recovery)	1 Min 130	3 Min 102	6 Min 96	N/A	N/A	N/A

ZONE	% LT	SYSTEMS CHALLENGED	TRAINING TYPE	DURATION OF EXERCISE
1	< 80% RPE 1-2	**Oxidative** ↑Aerobic energy sources & pathways ↑Capillary density, distribution ↑Use fat while sparing glycogen ↑musculoskeletal adaptations **Easy and relaxed pace, gentle breathing**	**Active Recovery** Base building Over-distance Active Living	1-5 days/wk 20-240 min. or more per session
2	80-90% RPE 2-3	**Oxidative** ↑Aerobic endurance ↑Economy of motion ↑Health enhancement **Comfortable pace, deeper breathing**	**Endurance** Aerobic intervals	2-3 days/wk 30-120 min. + Intervals (20-30min.)
3	91-99% RPE 3-4	**Muscular endurance** ↑Aerobic energy pathways & economy ↑ VO^2 Kinetics (Transport) ↑Slight increase in LT **Breathing begins to become labored**	**Sustainable Power** Long intervals Tempo work	1-2 days/wk 20-60 min. Intervals (10-30 min.)
4	100-105% RPE 4-6	**Muscular Endurance & Power** ↑ Aerobic energy pathways ↑LT & Lactate clearance **All out pace to sustain up to an hour of activity**	**LT Intervals** Fartlek Race pace Speed work	1-2 days/wk 20-40 min. Intervals (5-20min.) Recovery (1-5 min.)
5	>106% RPE >6	**Anaerobic endurance & Speed** ↑Anaerobic energy sources ↑Neuromuscular coordination ↑Strength & Power	Race Speeds + Anaerobic intervals	1 day/wk 30 sec. – 2 min. Recovery (1-3 min.)
6	N/A	**1, 3 & 6 Minute Recovery Heart Rates** Aerobic energy pathways & recovery Lactate clearance	N/A	N/A

HOW YOUR VO2 MAX RESULTS COMPARE TO AGE & GENDER NORMS

Male **Your VO^2 Max 55.2** **Female**

Age	Ex	Good	Average	Fair	Poor	Ex	Good	Average	Fair	Poor
<29	>53	44-52.9	34-43.9	25-33.9	<2.9	>49	39-48.9	31-38.9	24-30.9	<23.9
30-39	>50	42-49.9	31-41.9	23-30.9	<22.9	>45	37-44.9	28-36.9	20-27.9	<19.9
40-49	>45	39-44.9	27-38.9	20-26.9	<19.9	>42	35-41.9	25-34.9	17-24.9	<16.9
50-59	>43	38-42.9	25-37.9	18-24.9	>17.9	>40	34-39.9	22-33.9	15-21.9	>14.9
60-69	>41	36-40.9	23-35.9	16-22.9	<15.9	>37	33-36.9	21-32.9	13-20.9	<12.9

THE KEY DATA POINTS FROM YOUR TEST AND WHAT THEY MEAN.

Max Fat Zone –The point at which you maximize fat utilization for fuel. Ideally this would be as high a point (intensity, HR, Watts, etc.) as possible for an endurance athlete to preserve glycogen for when it matters most.

1.20	**L/min**
14.5	**ml/kg/min**
75-85/1	**Heart Rate/RPE**

Aerobic base- Defined as the point at which you transition to more than 50% of your energy being derived from glycogen instead of fat. The higher this number (i.e., the higher the level of exertion) the better, because it means you can "spare" more glycogen for when you need it, and use as much fat as possible energy.

Your Aerobic Base:

2.25	**L/min**
26.6	**ml/kg/min**
110 / 5	**Heart Rate/RPE**

60% peak *VO2*– this is roughly the highest level of energy output a well-conditioned person can sustain for several hours. Some might call this "all-day speed." When doing a very long swim or bike ride (say, north of 4 hours), this is the maximum average power output one can sustain.

Your 60% peak VO2:

2.78	**L/min**
33.7	**ml/kg/min**
122 / 6	**Heart Rate/RPE**
100	**% Glycogen dependence**

Anaerobic threshold (AT)– as we measure it, this is the point at which your body starts to accumulate lactic acid faster than it can metabolize, or clear, it. We use this as a pretty good (but not perfect) approximation for when your body transitions from being aerobic (able to process fat or glycogen in an oxygen-rich cellular environment) to being anaerobic (only able to process glycogen in an oxygen-poor cellular environment). Aerobic metabolism is much more efficient than anaerobic metabolism, hence you want this threshold to be as high as possible, and ideally you want this point to be determined by lactate generation, and not substrate cross-over (i.e., inability to burn fat).

Your AT:

3.70	**L/min**
44.9	**ml/kg/min**
146/ 7	**Heart Rate/RPE**
100	**% Glycogen dependence**

Max *VO*^{2}– this is where you fall off the bike or treadmill. It's the last bit of what we refer to as "anaerobic cap" performance. You can only sustain it for fraction of time, but it's a 100% glycogen-dependent state of maximum output**.**

Your Max VO^2:

4.55	**L/min**
55.2	**ml/kg/min**
173 / 8+	**Heart Rate/RPE**

So what does all this tell us? Basically it breaks athletes down into two main groups. Group 1: Your goal is to be more metabolically flexible and efficient in the aerobic environment, a particularly important factor for those who compete in events longer than a few minutes (e.g., 10K, marathon, triathlon), but less so for those doing short-burst activity. Improved aerobic efficiency and fuel adaptation means that we rely on much more fat, rather than glycogen, during prolonged exertion. This frees one up from needing to be constantly eating during long exercise bouts. Group 2: Your goal is more recreational than competitive with a focus on weight management and using exercise as a tool to achieve a healthy lifestyle. If you fall into this group then metabolic efficiency may be counterproductive. For many recreational athletes, often choosing to participate in a sport for the benefit of being able to eat more and still lose weight, metabolic efficiency may result in frustration. A recreational athlete, many think that training will allow them to eat more, but unless metabolism is raised simultaneously with training, weight gain is more likely to result than weight loss.

PERFORMANCE TRAINING TO IMPROVE LACTATE THRESHOLD

High Volume Training (Active Recovery -Endurance)

Initially, the best way to improve the lactate threshold levels is to increase training volume, regardless of the cardiovascular mode of exercise. **Exercising in Energy Zones 1 & 2.** Following a build-up in training volume, you may begin maximal steady-state exercise and interval training sessions. **Exercising in Energy Zones 3,4 & 5.** Collectively, **these sessions should consist of no more than 10% each of the total weekly volume** (Foran 2001). While this approach may appear conservative, it will help to prevent over training and injuries and is a wonderful starting place.

ZONE	% LT	SYSTEMS CHALLENGED	TRAINING TYPE	DURATION OF EXERCISE
1	**< 80%** **RPE 1-2**	**Oxidative** ↑Aerobic energy sources & pathways ↑Capillary density, distribution ↑Use fat while sparing glycogen ↑musculoskeletal adaptations **Easy and relaxed pace, gentle breathing**	**Active Recovery** Easy distance Base building Over-distance Active Living	1-5 days/week 20-240 minutes or more per session
2	**80-90%** **RPE 2-3**	**Aerobic Endurance Oxidative** ↑Aerobic endurance ↑Economy of motion ↑Health enhancement **Comfortable pace, deeper breathing**	**Endurance** Steady state Aerobic intervals	2-3 days/week 30-120 min. + Intervals (20-30m.)

Increased training volume should be gradual and in the order of approximately 10-20% per week (Bompa 1999). Heart Rate or The Rating of Perceived Exertion (RPE) scale should be used to prescribe cardiorespiratory exercise intensity during this period. For this high volume training, you should train at an RPE of 1-4, which subjectively is a light exercise intensity level. Mix up the total time per session of cardiovascular exercise throughout the week; however it works best for the individual. However, the minimum bout of cardiovascular exercise should be 10 minutes in duration. The major benefit of increased training volume is an increased capacity for mitochondrial respiration, which is imperative to improvements in lactate threshold.

Maximal Steady-State Training (MSS)

Steady-state training at the lactate threshold is often referred to as "maximal steady-state" exercise or "tempo runs." Research has shown that the lactate threshold occurs at 80-90% of heart rate reserve (HRR) in trained individuals and at 50-60% HRR in untrained individuals (Weltman 1995). Without access to an exercise physiology laboratory to get actual lactate threshold measurements Heart rate and RPE scale will be the most accurate ways to determine training intensity for maximal steady-state exercise sessions.

ZONE	% LT	SYSTEMS CHALLENGED	TRAINING TYPE	DURATION OF EXERCISE
3	91-99% RPE 3-4	**Muscular endurance** ↑Aerobic energy pathways & economy ↑ VO^2 Kinetics (Transport) ↑Slight increase in LT **Breathing begins to become labored**	**Sustainable Power** Long intervals Tempo work	1-2 days/week 20-60 minutes Intervals (10-30 min.)

Interval Training; Above the Lactate Threshold (IT)

Interval training workouts are high-intensity training sessions performed for short durations of time at velocities or workloads above the lactate threshold.

ZONE	% LT	SYSTEMS CHALLENGED	TRAINING TYPE	DURATION OF EXERCISE
4	100-105% RPE 4-6	**Muscular Endurance & Power** ↑ Aerobic energy pathways ↑LT & Lactate clearance **All out pace to sustain up to an hour of activity**	**LT Intervals** Fartlek Race pace Speed work	1-2 days/week 20-40 minutes Intervals (5-20min.) Recovery (1-5 min.)
5	>106% RPE >6	**Anaerobic endurance & Speed** ↑Anaerobic energy sources ↑Neuromuscular coordination ↑Strength & Power	Race Speeds Anaerobic intervals	1 day/week 30 sec. – 2 min. Recovery (1-3 min.)

During the high-intensity bouts above the lactate threshold, you should be working above a 7-8 RPE (subjectively training at a HARD or VERY HARD intensity), but below an all-out effort (9 or 10 RPE). During recovery workout at a very light intensity (less than 4 RPE). Similar to maximal steady-state sessions, the **total interval training workout time should not exceed 10% of weekly training volume.** Avoid scheduling the interval training workouts and maximal steady-state exercise sessions in back-to-back workouts.

Sample training week based on a 300 min/week total volume.*

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Endurance/AR **60-75 min.** **Zone 1 or 2**	**LT Intervals** **20-30 min.** **Zone 4**	**Active Recovery** **30-60 min.** **Zone 1**	**MSS/Tempo** **30-60 min.** **Zone 3**	**Active Recovery** **30-60 min.** **Zone 1**	**Interval Day** **20-30 min.** **Zone 5**	**Endurance** **30-60 min.** **Zone 2**

*this would be typical of a mid-season training plan.

Name: John Sample Age: 43 Height: 73” BMI 24 Date: 9/30/2013

Body Composition Profile

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Fitness Testing Lab

1. BOD POD Analysis

Body Fat	14.2	%
Fat Mass	25.8	lbs.
Lean Body Mass	156.2	lbs.
Total Weight	182.0	lbs.
Est. RMR	1875	Kcal/day

2. Skinfold Measurements:

Sum of 3 Skinfolds			
Men		Women	
Chest	11	Triceps	
Abdomen	20	Suprailiac	
Thigh	13	Thigh	
Sum	44	Sum	0
% Fat	15.3	% Fat	

	Body Fat Rating	Men	Women	Explanation
	Risky (too low)	<5%	<15%	Too little body fat can present health risks, especially for women.
	Ultra Lean	5-8%	15-18%	Fat levels sometimes found in elite athletes
	Lean	9-12%	19-22%	Lower body fat levels than many people.
X	Moderately Lean (recommended)	13-20%	23-30%	Fat level is acceptable for good health.
	Excess Fat	21-30%	31-40%	Indicates an excess accumulation of fat over time.
	Risky (too high)	>30%	>40%	Too much body fat can pose serious health risks.

Name: John Sample **Age:** 43 **Height:** 73" **BMI** 24 **Date:** 9/30/2013

Classification: Below Norm Within Norm Above Norm

LEAN BODY MASS NORMS											
	Height (inches)										
MEN	**65"**	**66"**	**67"**	**68"**	**69"**	**70"**	**71"**	**72"**	**73"**	**74"**	**75"**
LBM-lbs.	108-120	110-125	112-129	118-132	122-137	127-145	133-153	137-163	140-168	143-176	145-183
WOMEN	**60"**	**61"**	**62"**	**63"**	**64"**	**65"**	**66"**	**67"**	**68"**	**69"**	**70"**
LBM-lbs.	70-86	73-89	75-91	78-93	81-96	83-99	86-102	90-105	93-109	95-115	98-119

1. **Calculation of desirable weight range.** Note: body composition should be retested to determine if Lean Body Mass has changed as a result of losing weight and/or participating in a fitness program:

LBM	Desired % BF	Weight Range
156.2	9%	171
	12%	177

Summarize body composition results and make any recommendations to maintain/improve your body composition.

Obesity reduces life expectancy by increasing the risks of coronary artery disease, hypertension, Type II diabetes, obstructive pulmonary disease, osteoarthritis, and certain types of cancer. Obesity, or over fatness, constitutes one of the most significant health risks in the United States today. Studies show higher levels of blood fats, elevated blood pressure, and an increased risk of various cardiovascular and metabolic diseases in men over 20-25% fat and in women over 30-35%. Obesity is directly or indirectly associated with 15-20% of the annual mortality in the U.S.

Too little body fat also poses a health risk because the body needs a certain amount of fat for normal physiological functions. Essential and nonessential lipids found in adipose tissue, provide thermal insulation and store metabolic fuel. In addition, lipids are involved in the transport and storage of fat-soluble vitamins (A, D, E, and K); in the functioning of the nervous system, the menstrual cycle, and the reproductive system; and in growth and maturation during pubescence.

To lose 1 pound of body fat a person must expend or create a deficit of 3500 calories. The Fitness Testing Lab suggests you achieve the deficit through a combination of exercise and eating a, healthy diet of calories specific to your body's needs. If you have additional questions concerning your results or wish to complete additional testing to achieve your goals please call the Clark Fitness Testing Lab.

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