# ATHLETIC PERFORMANCE PROFILE

Clark College

Fitness Testing Lab

## Sample , YOUR TRAINING HEART RATE ZONES ARE LISTED BELOW

The following heart rate zones were determined from your exercise test on /2017. 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 | Time |
|---|---|---|---|---|---|---|---|
| Zone 1 (HR @ 75-85% LT) VT1 | 132 | 116 | 132 | 543 | 216.6 | 150 | 8:58 |
| Zone 2 (HR @ 85-95% LT) | 147 | 133 | 149 | 691.8 | 102.6 | 179 | 10:27 |
| Zone 3 (HR @ LT) VT2 | 155 | 150 | 158 | 711 | 49.2 | 194 | 11:18 |
| Zone 4 (HR @ 105% of Peak LT) | 163 | 159 | 165 | 761.4 | 0 | 205 | 11:57 |
| Zone 5 (Peak effort) | 182 | 166 | 182 | 1022.4 | 0 | 292 | 15:48 |
| Heart Rate Recovery | 146 | 2 Min | 100 | N/A | N/A | N/A | N/A |

| ZONE | % LT | SYSTEMS CHALLENGED | TRAINING TYPE | DURATION OF EXERCISE |
|---|---|---|---|---|
| 1 VT1 | < 80% RPE 1-2 | **Oxidative**<br>↑Aerobic energy sources & pathways<br>↑Capillary density, distribution<br>↑Use fat while sparing glycogen<br>↑musculoskeletal adaptations<br>**Easy and relaxed pace, gentle breathing** | **Active Recovery**<br>Base building<br>Over-distance<br>Active Living | 1-5 days/wk<br>20-240 min. or more per session |
| 2 | 80-90% RPE 2-3 | **Oxidative**<br>↑Aerobic endurance<br>↑Economy of motion<br>↑Health enhancement<br>**Comfortable pace, deeper breathing** | **Endurance**<br>Aerobic intervals | 2-3 days/wk<br>30-120 min. +<br>Intervals (20-30min.) |
| 3 VT2 | 91-99% RPE 3-4 | **Muscular endurance**<br>↑Aerobic energy pathways & economy<br>↑ $VO^2$ Kinetics (Transport)<br>↑Slight increase in LT<br>**Breathing begins to become labored** | **Sustainable Power**<br>Long intervals<br>Tempo work | 1-2 days/wk<br>20-60 min.<br>Intervals (10-30 min.) |
| 4 | 100-105% RPE 4-6 | **Muscular Endurance & Power**<br>↑ Aerobic energy pathways<br>↑LT & Lactate clearance<br>**All out pace to sustain up to an hour of activity** | **LT Intervals**<br>Fartlek<br>Race pace<br>Speed work | 1-2 days/wk<br>20-40 min.<br>Intervals (5-20min.)<br>Recovery (1-5 min.) |
| 5 | >106% RPE >6 | **Anaerobic endurance & Speed**<br>↑Anaerobic energy sources<br>↑Neuromuscular coordination<br>↑Strength & Power | **Race Speeds +**<br>Anaerobic intervals | 1 day/wk<br>30 sec. – 2 min.<br>Recovery (1-3 min.) |
| 6 | N/A | **2 Minute Recovery Heart Rate**<br>Aerobic energy pathways & recovery<br>Lactate clearance | N/A | N/A |

## HOW YOUR VO$^2$ MAX RESULTS COMPARE TO AGE & GENDER NORMS

**Your VO$^2$ Max: 47.97 ml/kg/min places you in the Good category for age and gender**

| | MALE | | | | | | FEMALE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | Ex | Good | Average | Fair | Poor | | Ex | Good | Average | Fair | Poor |
| <29 | >53 | 44-52.9 | 34-43.9 | 25-33.9 | <25.9 | | >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 |

## HEART RATE RECOVERY (HRR) NORMS

HRR is an index of cardiovascular fitness. It is well established that HRR is a strong predictor of both cardiovascular-related fitness and all-cause mortality in healthy adults. In general, the following applies to an athlete's HRR:

1. A slight increase in HRR accompanies fitness gain during a training cycle
2. An unexpected increase in HRR may indicate fatigue due to training
3. A decrease in HRR during a training cycle may indicate overtraining

**Your 2 minute HRR results: BPM**

| | | |
|---|---|---|
| **Less than 22:** | **Poor cardiovascular recovery** | |
| **22-52:** | **Indicates a below average cardiovascular recovery** | **46** |
| **53-58:** | **Indicates optimal cardiovascular recovery** | |
| **59-65:** | **Indicates above average cardiovascular recovery** | |
| **66 or more:** | **Indicates an elite cardiovascular recovery** | |

## HOW YOUR PULMONARY FUNCTIONS COMPARE TO NORMS

Normal values are based upon your age, height, ethnicity, and gender. Normal results are expressed as a percentage. A value is usually considered abnormal if it is less than 80% of your predicted value. We look at three measurements:

**Forced Vital Capacity (FVC)** The amount of air exhaled forcefully and quickly after maximum inspiration.

**Forced Expiratory Volume 1 (FEV1)** The volume of air expired during the first, second of the FVC test.

**Forced Expiratory Volume 1% (FEV1%)** The proportion of FVC that was expired during the first second.

| SPIROMETRY | FVC | FEV1% | FEV1 |
|---|---|---|---|
| YOUR TEST | 5.02 | 81% | 4.08 |
| NORMS | 5.23 | 75-85% of FVC | 4.22 |
| % OF NORM | 96% | | 97% |

## 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.

| | |
|---|---|
| 64 | Watts |
| 17.5 | ml/kg/min |
| 84/1 | Heart Rate/RPE |

**Aerobic base/Crossover-** Defined as the point at which you transition to more than 50% of your energy being derived from glycogen instead of fat. Training below your crossover point will help you become more metabolically efficient, sparing glycogen and using fat as fuel.

| | |
|---|---|
| 132 | Watts |
| 24.4 | ml/kg/min |
| 114/3 | Heart Rate/RPE |

**60% peak *VO*$^2$–** 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.

| | |
|---|---|
| 146 | Watts |
| 25 | ml/kg/min |
| 121/4 | Heart Rate/RPE |
| 61% | % 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. Your AT can serve as an "anchor point" from which your training zones are developed.

| | |
|---|---|
| 194 | Watts |
| 33.4 | ml/kg/min |
| 155/5.5 | Heart Rate/RPE |
| 98% | % Glycogen Dependence |

**Max *VO²*–** 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. Aerobic Capacity (e.g., VO2 at maximum effort) is a Key Performance Indicator of your endurance potential. Higher consumption = higher endurance potential.

| | |
|---|---|
| 292 | Watts |
| 47.97 | ml/kg/min |
| 182/8+ | Heart Rate/RPE |

**Power to Weight Ratio (PWR) -** The PWR is simply the power a person generates (watts), divided by their body weight. Whatever body type you may have, improving your PWR will aid you in reaching your full potential. An athlete with a higher PWR will ride and run faster and climb hills better compared to a person with a lower PWR. Some research has shown that a runner can gain 1% in running speed for every 1% reduction in body fat.

| Watts-Max | Kgs. | PWR | NORMS | MEN | WOMEN |
|---|---|---|---|---|---|
| 292 | 70.4 | 4.15 | EX. | 4.0+ | 3.8+ |
| Watts-LT | Kgs. | PWR | AVG. | 3.3 | 3.1 |
| 194 | 70.4 | 2.76 | POOR | >3.0 | >2.7 |

**Metabolic Fitness-** your capacity to deliver $O^2$ at or near your Anaerobic threshold (AT) also expressed as $VO^2$ at threshold. By working to increase the AT $VO^2$ you are in fact working to increase your sustainable calorie burn potential during exercise by increasing calories burned with each type of workout as well as increasing your capability to burn calories initially after working out (e.g., epoc elevated). As a measure of performance, the closer $VO^2$ Max and $VO^2$ at threshold are indicates the ability to sustain higher intensity exercise for longer periods of time.

**Your $VO^2$ at Threshold is 33.4 ml/kg/min putting you in the FAIR category based on your age and gender**

**$VO^2$ at Threshold Norms Chart**

| AT-$VO^2$ | Women | Low | Fair | Avg. | Good | High | Athletic | Olympic |
|---|---|---|---|---|---|---|---|---|
| | 20-29 | <24 | 25-29 | 30-37 | 38-41 | 42-45 | 46-50 | 51+ |
| | 30-39 | <23 | 24-28 | 29-35 | 36-40 | 41-44 | 45-49 | 50+ |
| | 40-49 | <21 | 22-26 | 27-34 | 35-38 | 39-42 | 43-47 | 48+ |
| | 50-65 | <18 | 19-24 | 25-31 | 32-35 | 36-38 | 39-42 | 43+ |
| Age | | | | | | | | |
| | Men | Low | Fair | Avg. | Good | High | Athletic | Olympic |
| | 20-29 | <32 | 33-37 | 38-43 | 44-47 | 48-52 | 53-58 | 59+ |
| 33.4 | 30-39 | <29 | 30-34 | 35-40 | 41-43 | 44-48 | 49-54 | 55+ |
| | 40-49 | <25 | 26-30 | 31-36 | 37-40 | 41-45 | 46-51 | 52+ |
| | 50-59 | <21 | 29-26 | 27-33 | 34-36 | 37-41 | 42-47 | 48+ |
| | 60-65 | <18 | 19-23 | 24-30 | 31-33 | 34-47 | 38-42 | 43+ |

| Name | Age | Ht. | Wt. | Frame | BMI | Date |
|---|---|---|---|---|---|---|
| Sample | 37 | 68.5 | 155.2 | Sm | 23.5 | 2017 |

## 1. Skinfold Measurements:

| Sum of 3 Skinfolds | | | |
|---|---|---|---|
| **Men** | | **Women** | |
| Chest | 10 | Triceps | |
| Abdomen | 27 | Suprailiac | |
| Thigh | 19 | Thigh | |
| **Sum** | 56 | **Sum** | 0 |
| % Fat | **17.7** | % Fat | |

## 2. BOD POD Analysis:

| | | |
|---|---|---|
| Body Fat | 17.9 | % |
| Fat Mass | 27.7 | lbs. |
| Lean Body Mass | 127.4 | lbs. |
| Total Weight | 155.2 | lbs. |
| Est. RMR | 1542 | Kcal/day |

| You | 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. |

**Classification:** Below Norm Within Norm Above Norm

**LEAN BODY MASS NORMS**

| MEN Ht. | 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 Ht.** | **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 |

- **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.

- According to the World Health Organization your “ideal” weight should be between 127 to 162 Lbs. Because of your frame size, lean body mass and percentage body fat a more realistic goal weight for health would be **140 to 144** Lbs.

| LBM | | | Desired % BF | | Weight Range |
|---|---|---|---|---|---|
| 127.4 | | | 9% | | 140 |
| | | | 12% | | 144 |

# VARIABLES THAT AFFECT OUR ABILITY TO BUILD MUSCLE & LOSE FAT:

- **Hydration:** Our body's particularly metabolically active tissues like our muscles are made up of mostly water. When we are dehydrated we are not able to function properly and our metabolism slows down. Try and drink half your bodyweight in ounces each day plus 16-20 oz. for every hour of exercise. http://www.webmd.com/diet/water-for-weight-loss-diet
- **Stress:** Stress hormones like cortisol can cause us to overeat by increasing insulin which in turn drops blood sugar and we crave sugary, fatty foods. Shoot for 20 min. a day of de-stressing, try meditation, reading, yoga or walking. http://www.webmd.com/diet/stress-weight-gain
- **Sleep:** Our bodies need sleep to recover and for hormonal balance, without sufficient rest the hard work we put in will not have much impact. Studies suggest that most people need 7 to 9 hrs. of sleep each night to be fully rested and ready for an active day. http://www.webmd.com/diet/sleep-and-weight-loss
- **Exercise & Activity:** Exercise is important to weight management and we should break a sweat 3 to 5 times a week for at least 30 minutes, but what may be more important is how active you are outside of the gym. We burn 200 to 900+ Kcals a day from non-exercise activity thermogenesis or N.E.A.T. depending on how much we move. Try and meet a goal of not sitting more than 30 minutes without taking a 2 to 3 minute "movement snack".
- **Nutrition & Eating for Good Health:** Choosing the right foods helps promote health and reduces your risk of chronic diseases. Your meals should emphasize fresh, unprocessed plant-based foods, with a few lean animal products. Eating whole foods, while limiting consumption of highly processed and refined foods, added sugar and solid fats can also help maintain calorie balance over time helping sustain a healthy weight.
- Our recommendation based on your TDEE (see chart below) is to eat at least **2100 to 2400** Kcals a day.

**Your Total Daily Energy Expenditure (TDEE) to maintain your current body composition.**
The number of calories you need to sustain regular activity* in the various intensity zones

| | Max HR | 182 | REE | 1542 | Kcals |
|---|---|---|---|---|---|
| **Activity Zones** | **HR** | **Zone** | **Kcals/day Range** | | |
| Zone 1 Light Activity (ADL) | Resting HR | 73 | 1850.4 | 2158.8 | |
| Zone 2 Moderate Activity | 73 | 109 | 2158.8 | 2467.2 | |
| Zone 3 Vigorous Activity | 109 | 146 | 2467.2 | 2775.6 | |
| Zone 4 Very Vigorous Activity | 146 | Max HR | 2775.6 | 3084 | |

*Based on Harris-Benedict Standard Activity Factor Scores

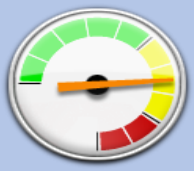
# FUEL DEPLETION CALCULATOR

| Workload/Intensity | | | Total Calories | | Caloric Burn Rate Per Minute | | | | Per Hour | | Fuel expenditure During Workout | | | Benchmarks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Power Watts | RPE | HR bpm | Total Kcals/min | Total Kcals/hr | Fat Kcals/min | CHO Kcals/min | Fat Grams | CHO Grams | CHO Kcals/hr | Zone | Time at intensity (min) | Total CHO Burned | Total Kcals Burned | | | |
| 64 | 1 | 84 | 5.79 | 347.4 | 5.55 | 0.24 | 0.62 | 0.06 | 14.4 | MF* | 30 | 7.2 | 173.7 | 1. Current Body Weight | 155.2 | lbs |
| 150 | 4 | 141 | 9.05 | 543 | 3.61 | 5.44 | 0.40 | 1.36 | 326.4 | 1 | 30 | 163.2 | 271.5 | Percent Body Fat | 17.9 | % |
| 132 | 3 | 114 | 8.33 | 499.8 | 4.17 | 4.16 | 0.46 | 1.04 | 249.6 | AB* | 30 | 124.8 | 249.9 | 2. Metabolic Efficiency | 124 | bpm |
| 179 | 5 | 149 | 11.53 | 691.8 | 1.71 | 9.82 | 0.19 | 2.46 | 589.2 | 2 | 90 | 883.8 | 1037.7 | (Aerobic Threshold - VT1) | 150 | Watts |
| 194 | 5.5 | 155 | 11.85 | 711 | 0.82 | 11.03 | 0.09 | 2.76 | 661.8 | 3/LT* | 30 | 330.9 | 355.5 | | 3.61 | Fat Kcals/min |
| 205 | 6 | 162 | 12.69 | 761.4 | 0 | 12.69 | 0.00 | 3.17 | 761.4 | 4 | 30 | 380.7 | 380.7 | 3. Lactate Threshold | 155 | bpm |
| 292 | 8 | 182 | 17.04 | 1022.4 | 0 | 17.04 | 0.00 | 4.26 | 1022.4 | 5 | 30 | 511.2 | 511.2 | (Anaerobic Threshold - VT2) | 194 | Watts |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | 30 | 0 | 0 | | 47.97 | VO2 Max |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | 30 | 0 | 0 | 4. Resting Metabolic Rate Est | 1542 | Kcals |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | 30 | 0 | 0 | | | |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | 30 | 0 | 0 | | | |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | 30 | 0 | 0 | | | |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | 30 | 0 | 0 | | | |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | | 0 | 0 | | | |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | | 0 | 0 | | | |
| | | | 0 | 0 | | 0 | 0.00 | 0.00 | 0 | | | 0 | 0 | *Max Fat burning | | |
| | | | | | | | | | | | | | | *Aerobic Base | | |
| | | | | | | | | | | | | | | *Lactate/Anaerobic Threshold | | |

| Intake During Exercise | | | | | | | Expenditure During Exercise | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Exercise Time | | Fuel Intake/hr (100 - 300 Kcals) | | | | | | | | |
| Min. | | Calories Consumed During Activity | | | | Total CHO Burned | | | | |
| 90 | | | 100 | 100 | Kcals | | 884 | Kcals | 784 | CHO To Replace |
| Total Calories Burned During Workout = | | | 1038 | Less Calories Consumed = | | | 938 | Total # of Calories to Replace | | |

Enter you data in the purple highlighted cells

# Fluid Replacement Moderate Day



What was your exercise mode (e.g., bike, run, swim, etc.)?
How long was you event? minutes
What was the temp.? (if you know) degrees F
What was the humidity? % sat.

Plug in your pre-event weight w/out cloths here pounds
Plug in your post-event weight w/out cloths here pounds
The difference in pounds lost or gained = 0
*(>2% water loss can reduce your performance significantly)*
Pounds lost / body weight = % of body weight lost during event: % body weight loss

Your fluid lost during exercise = **0** ounces lost

Record your fluid intake (in ounces) during exercise here ounces ingested
*(note: 8 oz. = 1 cup = 225 ml. or 16 oz. = 450 ml. or a little less than 1/2 Liter)*

The total amount of fluids you need to consume during and/or replace after exercise = **0** ounces
*(fluid lost + fluid ingested)*

Your water loss rate was… ounces/minute
ounces/15 minutes

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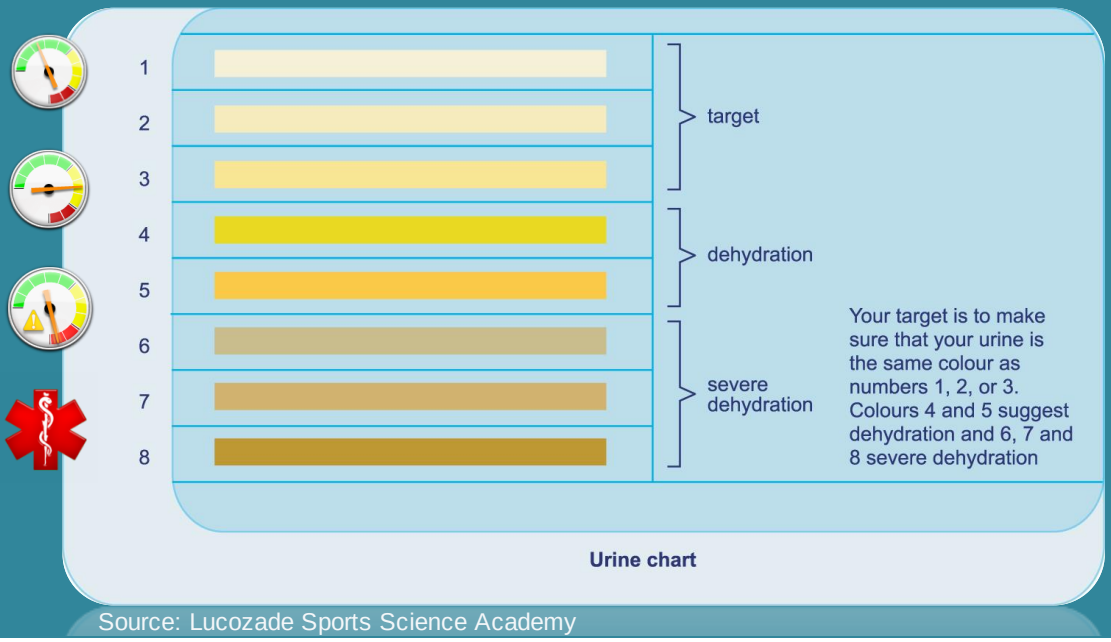
To determine how much fluid you lose or gain during training or competition, use the chart to the left to record your body weight (no cloths) to the nearest pound before and after your workouts. If you lost more than 1% of your body weight, you drank too little; if you gained weight, you probably drank too much. If you regularly lose more than 1% of your body weight, you need to drink more during and after exercise to stay hydrated. Remember, it can also be dangerous to gain weight during exercise by drinking too much. Note: dark urine can also be a sign of dehydration. See Pee Chart Sheet by clicking on tab below.

# Clark College Fitness Testing Lab
# Dehydration Chart




Source: Lucozade Sports Science Academy

# MUSCULAR STRENGTH, ENDURANCE AND FLEXIBILITY RESULTS

## PLANK HOLD TEST FOR CORE MUSCULAR STRENGTH:

The Plank Hold Core Test can provide a good indicator of your core and back strength. It's a test that can be performed often, and can show large improvements over a short time frame. Test scores that are less than prior attempts or that are in the "red zone" can indicate weaknesses due to fatigue or over training. This is probably the easiest test to do and requires no complex movements, only a flat surface and a watch or a stopwatch. If you are working your core during your training, you are training for this test and can conduct this test on your own. It is highly unlikely you would ever injure yourself doing this test, however It's not a good test if you have a lower back injury, or if you're lower back muscles are knotted or in spasm. While you cannot really injure yourself with this test, it is possible to exacerbate an existing injury if you do not engage the correct muscles groups. Therefore, technique is everything, and this requires that you really understand how to activate your abdominal core without over compensating with your back muscles. Here is how you did and how you compare to others:

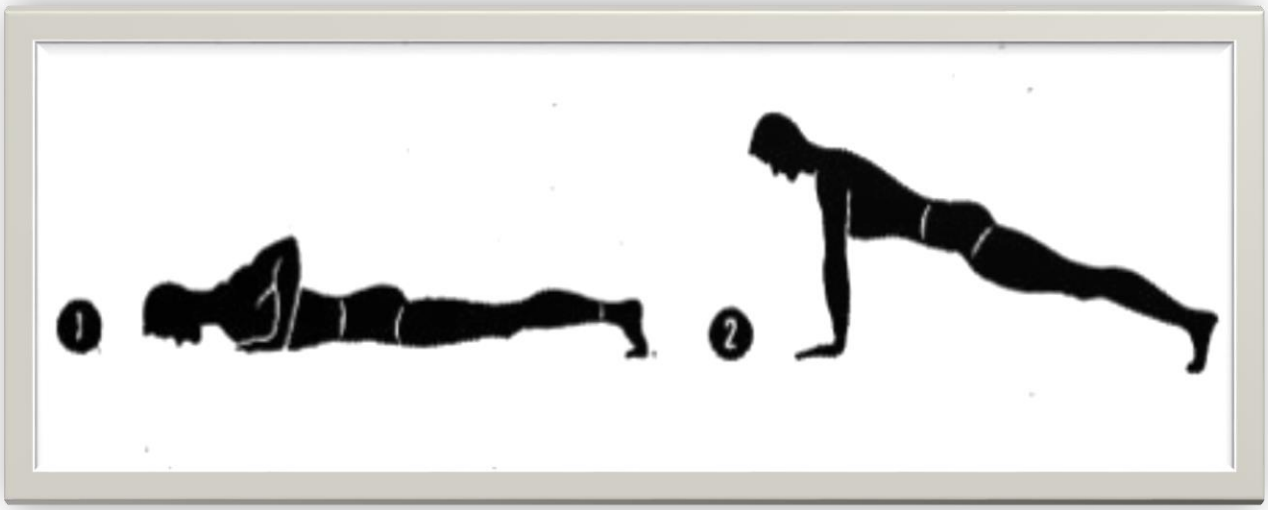
| Rating | Time (Minutes and Seconds) | Your Score |
|---|---|---|
| Excellent | 2:00 + | 3:00 |
| Good | 1:15 – 1:59 | |
| Average | 0:45 – 1:14 | |
| Poor | 0:45 or less | |

| | Male | Female |
|---|---|---|
| World record | 33:00 | 33:00 |
| Exceptional | 6:30 + | 6:00 + |
| Very strong | 2:40-4:30 | 2:40-4:00 |
| Strong | 1:20-2:40 | 1:20-2:40 |
| Healthy | :60-1:20 | :60-1:20 |
| Acceptable | :30-:60 | :30-:60 |
| Weak | :11-:29 | :11-:29 |
| Very Weak | :01-:10 | :01-:10 |
| Alarmingly Weak | can't hold position | |

# MUSCULAR ENDURANCE –MAX PUSH UPS:

The push-up test is a basic fitness test used by coaches, trainers and athletes to assess upper body fitness and to monitor progress during strength and fitness training. This simple test helps you compare your own upper body muscular endurance to others of your age and gender, and track your fitness program over time. Strength and endurance in the muscles of the upper body, specifically the chest, shoulders, triceps and core is a good indication of overall fitness. This simple exercise engages muscles throughout the entire body -- from head to toe -- in order to maintain a rigid position. Upper body strength and endurance is essential for athletes such as swimmers, climbers, or golfers who demand strength and power from their arms and shoulder to perform well and avoid injury. However, a strong upper body is also important for everyone who wants to perform everyday movements, such as carrying luggage or picking up children, with ease and without risking injury. Here is how you scored:

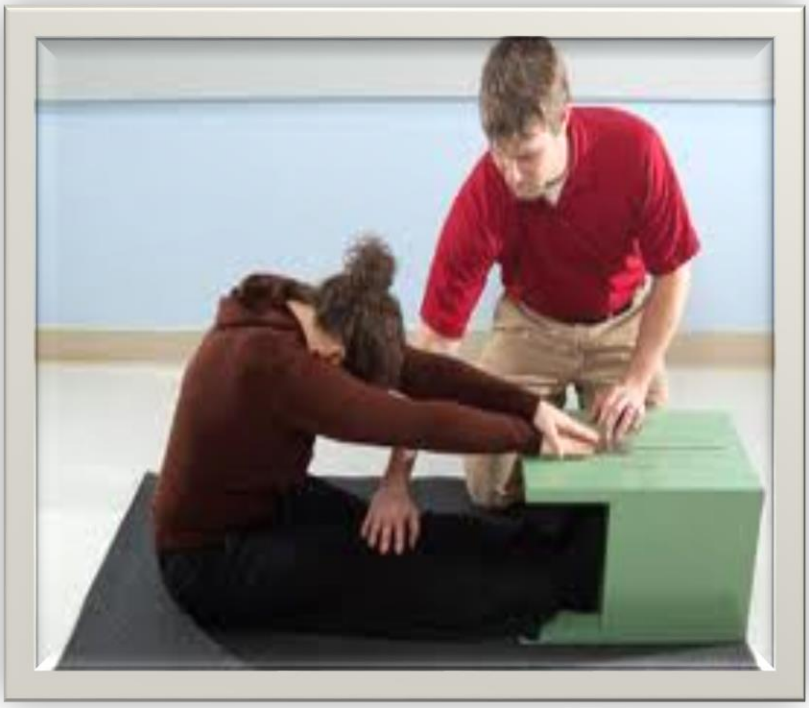
| | Male | | | | | | Female | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AGE | SUPER | EX | GOOD | FAIR | POOR | | SUPER | EX | GOOD | FAIR | POOR |
| 20-29 | >48 | 38-47 | 30-37 | 23-29 | <22 | | >37 | 31-36 | 24-30 | 18-23 | <17 |
| 30-39 | >40 | 31-39 | 25-30 | 18-24 | <17 | | >32 | 25-31 | 20-24 | 12-19 | <11 |
| 40-49 | >31 | 25-30 | 19-24 | 12-18 | <11 | | >25 | 19-24 | 14-18 | 7-13 | <6 |
| 50-59 | >26 | 20-25 | 14-19 | 10-13 | <9 | | >21 | 18-20 | 13-17 | 7-12 | <6 |
| YOU | 47 | | | | | | | | | | |



# MUSCULAR FLEXIBILITY—SIT & REACH:

The sit and reach test is the most common way to measure lower back and hamstring flexibility. Because tightness in the low back and hamstrings is often related to muscle pain and stiffness, this test may help determine a person's risk for future pain and injury. It has been used by exercise physiologists and fitness trainers for decades to assess baseline flexibility before starting an exercise program and is repeated after several weeks to determine progress. Because it has been around so long, it has a large database of results across all age groups and genders. For this reason, people continue to use it to compare a person's flexibility to the average result for their gender and age group. Here is how you did:

| | Male | | | | | Female | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AGE | EX | GOOD | AVERAGE | FAIR | POOR | EX | GOOD | AVERAGE | FAIR | POOR |
| <18 | >17.8 | 15.2-17.8 | 14-15.2 | 11.8-14 | <11.8 | >17.8 | 16-17.8 | 14.5-16 | 12.6-14.5 | <12.6 |
| 19-35 | >17.0 | 15-17 | 13.5-15 | 11.6-13.5 | <11.6 | >16.7 | 15.8-16.7 | 14.5-15.8 | 12.6-14.6 | <12.6 |
| 36-49 | >14.6 | 13.4-14.6 | 11.6-13.4 | 9.9-11.6 | <9.9 | >16.2 | 14.5-16.2 | 12.8-14.5 | 11.0-12.8 | >11 |
| >50 | >13.3 | 11.5-13.3 | 9.7-11.5 | 8.8-9.7 | <8.8 | >14.2 | 12.3-14.2 | 11.0-12.8 | 8.3-10.1 | >8.3 |
| YOU | | | | 10 | | | | | | |



# RESOURCES FOR HEART RATE ZONE TRAINING

Now that you have some data that is specific to you, how do you use it? No matter what type of athlete you are–beginner, intermediate, or advanced–a heart-rate monitor can help you train more effectively, but only if you apply sound training principles when using one otherwise it's just an expensive toy. There is a lot of information out there (too much in fact) on heartrate monitors and training so I've given you a few places to start:

**Best books:** **Heart Monitor Training for the Complete Idiot**, by John L. Parker; Sally Edwards

**Heart Zone Training**, by Sally Edwards

**Precision Heart Rate Training**, by Ed Burke.

**Best Web pages:** Check out the SportsMed Web site of Mark A. Jenkins, M.D., an Ironman triathlete. "The Heart" pages include a beginner's guide to heart-rate monitors and also graphs of athletes' actual heart rates during triathlons and road races of different distances. Go to **www.rice.edu/~jenky/heart.html**

**Best Apps:** **https://www.trainingpeaks.com/**

# RESOURCES FOR METABOLIC EFFICIENCY TRAINING

**Best books:** **Metabolic Efficiency Training: Teaching the Body to Burn More Fat**, by Bob Seebohar.

**Best Web pages:** **https://www.enrgperformance.com/**

# TRAINING FOR THE RIGHT GOAL & GETTING RESULTS

So what does all this tell us? It breaks athletes down into three 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 to be as efficient as possible for shorter, high intensity exercise sessions ranging from a few minutes to 30 minutes. Fuel utilization is less of a concern, but the ability to maintain high intensity work and to quickly recovery is very important. Finally, Group 3: 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. Remember to eat well, train smart and most of all have fun!

# 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 20% 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%**<br>**RPE 1-2** | **Oxidative**<br>↑Aerobic energy sources & pathways<br>↑Capillary density, distribution<br>↑Use fat while sparing glycogen<br>↑musculoskeletal adaptations<br>**Easy and relaxed pace, gentle breathing** | **Active Recovery**<br>Easy distance<br>Base building<br>Over-distance<br>Active Living | 1-5 days/week<br>20-240 minutes or more per session |
| **2** | **80-90%**<br>**RPE 2-3** | **Aerobic Endurance Oxidative**<br>↑Aerobic endurance<br>↑Economy of motion<br>↑Health enhancement<br>**Comfortable pace, deeper breathing** | **Endurance**<br>Steady state<br>Aerobic intervals | 2-3 days/week<br>30-120 min. +<br>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%**<br>**RPE 3-4** | **Muscular endurance**<br>↑Aerobic energy pathways & economy<br>↑ $VO^2$ Kinetics (Transport)<br>↑Slight increase in LT<br>**Breathing begins to become labored** | **Sustainable Power**<br>Long intervals<br>Tempo work | 1-2 days/week<br>20-60 minutes<br>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%**<br>**RPE 4-6** | **Muscular Endurance & Power**<br>↑ Aerobic energy pathways<br>↑LT & Lactate clearance<br>**All out pace to sustain up to an hour of activity** | **LT Intervals**<br>Fartlek<br>Race pace<br>Speed work | 1-2 days/week<br>20-40 minutes<br>Intervals (5-20min.)<br>Recovery (1-5 min.) |
| **5** | **>106%**<br>**RPE >6** | **Anaerobic endurance & Speed**<br>↑Anaerobic energy sources<br>↑Neuromuscular coordination<br>↑Strength & Power | Race Speeds<br>Anaerobic intervals | 1 day/week<br>30 sec. – 2 min.<br>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 workouts you should use 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.

## PUTTING YOUR PLAN TOGETHER & TRAINING FOR EXCELLENCE

**SAMPLE CARDIO TRAINING WEEK BASED ON A 300 MIN/5 HOUR TOTAL WEEKLY VOLUME.***

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

*this would be typical of a mid-season training plan focusing only on endurance sports.

## HOW TO PROMOTE REGENERATION AND ACTIVE RECOVERY

Preventing prolonged fatigue is Key - Overtraining, late nights, and/or poor nutrition will dump waste products into your blood and can deplete carbohydrate energy stores in the muscle. This metabolic stress taxes the nervous system and reduces your energy levels. This Metabolic Stress can be reduced with appropriate recovery time and technique in addition to fuel replenishment. Regeneration requires attention to sleep, work and travel patterns. If the activities in your daily living do not allow for down time (low stress/high relaxation) then recovery between exercise bouts will become progressively more difficult, if not impossible.

**Active recovery** is the participation in low intensity activities in between normal or intensive exercise bouts. Active recovery can be very effective at reducing metabolic stress and promoting super-compensation (i.e., the next level of increased performance).

**Immediate Response** - Recovery can be maximized by the following both passive and active recovery methods.

Recovering from longer or extensive training (i.e., long slow, Zone 1-3).
The functions below are in order of importance to the recovery process.

| Function | Response Function (activity after exercise) |
|---|---|
| 1. Nutritional (fluid and fuel stores)<br>2. Physiological (muscle cell)<br>3. Neurological (peripheral NS)<br>4. Psychological (central NS) | 1. Drink and eat (carbohydrates within 30 minutes post exercise).<br>2. Light exercise / stretch / massage<br>3. Contrast shower/spa / massage<br>4. Increase motivation / reinforce emotional health |

Recover from speed or intensive training (i.e., Zone 4-5)

| Function | Response Function (activity after exercise) |
|---|---|
| 1. Neurological (peripheral NS)<br>2. Physiological (muscle cell)<br>3. Nutritional (fluid and fuel stores)<br>4. Psychological (central NS) | 1. Contrast shower / spa / massage<br>2. Light exercise / stretch / massage<br>3. Drink and eat<br>4. Increase motivation / reinforce emotional health |

Recovery after races or high impulse (i.e., level of cumulative stress) training or to recover from sustained high intensity training in zones 3-5 (i.e., high impulse), at least 36 hours of recovery time will be required before additional high impulse training is continued.

Triathlon coach Gale Bernhardt suggest the following time-lines for race recovery:

- Bicycle races: 1 to 3 days per hour of racing
- Triathlon races: 3 to 5 days per hour of racing
- Running races: 4 to 6 days per hour of racing

Remember recovery is not wasted time; it is when our bodies are able to repair, rebuild, restore energy and ultimately get stronger. Without proper attention to recovery all the training, you do will have limited results and your full potential may never be reached.

## RESOURCES FOR OPTIMAL RECOVERY

**Best books:** **The Athlete's Guide to Recovery: Rest, Relax, and Restore for Peak Performance**, by Sage Rountree.

**Recovery for Performance in Sport**, by Institut National du Sport de l'Expertise et de la Performance INSEP (Editor), Christophe Hausswirth (Editor), Iñigo Mujika (Editor).

**Sleep Smarter: 21 Essential Strategies to Sleep Your Way to a Better Body, Better Health, and Bigger Success**

**Best Web pages:** **https://breakingmuscle.com/fitness/you-dont-need-more-training-you-need-more-recovery**

**Best Apps:** **https://www.myithlete.com/**
**https://elitehrv.com/**

# SOME FINAL THOUGHTS ON PERFORMANCE TRAINING

Performance is an assessment of how well a task is executed and the success of a training program is largely dependent upon satisfying the performance aims associated with it. As exercise physiologists we measure performance to help you determine potential health risks, current fitness levels and to give us a baseline from which to measure progress. Your test results today, reflect how successful your fitness programing has been. If your results were not where you would like them to be we can now look objectively at how best to get you as healthy and fit as you want. Your results are the first step toward optimal training to achieve your goals, but remember these results are just numbers and the true measure fitness/wellness how you are feeling and performing daily. One of the best ways to keep track of this is to journal regularly.

**Why record information?**
For the athlete it is important to monitor their program of work, to maintain progression in terms of the volume of work and its intensity. A training diary can give an enormous amount of information about what has happened in the past and how training has gone in the past. When planning future training cycles, information of this kind is invaluable.

**What should be recorded?**
The information to be recorded falls into two broad categories:

- The day-to-day information from training
    - State of the athlete (health, composure)
    - Physiological data (body weight, resting heart rate, etc.)
    - The training unit (speed, speed endurance, strength, technique)
    - The training load (the number of miles, the number of sets and repetitions, the number of attempts)
    - The training intensity (kilograms, percentage of maximum, percentage of $VO_2$)
    - The prevailing conditions (wet, windy, hot etc.)
    - The response to training (the assignments completed, the resultant heart rate recovery, felt tired, etc.)
    - Fueling (food intake be specific- amounts, types, when eaten and how you felt after)
- Information that measures status. This can take the form of a test. If the test is repeated throughout the program, it can then be used as a measure of progress within the training discipline. Examples of such tests are:
    - Time trials - speed, speed endurance, endurance
    - Muscular endurance - chins, push-ups, dips
    - Strength maximum - single repetitions, maximum repetitions
    - Explosive strength - power bounding, vertical jump, overhead shot putt
    - Mobility - objective measurements of the range of movement
    - Event specific

Please do not hesitate to let us know how we here at Clark College can help you be the best you possible. Good luck in all your future health and fitness training adventures!

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