



JUNIOR TESTING PROTOCOLS & BENCHMARKS

The goal of the Junior Performance Testing Program is designed to achieve three (3) key goals:

1. Create regular (quarterly) sports specific tests used as benchmarks for athletes to gauge their personal progress and isolate areas of weakness to target during their next training cycle
2. Provide comparable data to coaches to facilitate a greater understanding of where their athlete stands both nationally and internationally
3. Provide USAT staff with a greater understanding of athlete potential throughout the year, rather than rely solely on race day results in the short Junior season

The tests include a (1) swim, (2) bike and (3) bike/run and have been designed to give accurate information specific to current Junior triathlon performance standards. The testing administration protocol is basic and can easily fit into a weekly training program without excessive fatigue to the athlete.

Swimming 200/800 Test Set

The goal of the test is to simulate the initial 200m sprint that is traditional in a triathlon. This sprint is followed by a short (1 minute) rest and an 800m time trial. The goal of this 800m is to give a clear indication of an athlete's aerobic swimming ability and accurately test the energy systems that are used during the swim section of a triathlon. The test can be done in either a meter or yard pool and either short course or long. Appropriate conversion times are provided in the Benchmark section for comparison.

Swimming Test:

- **200m @ 100% effort – (Dive Start) - (record time)**
- **1 minute rest**
- **800m @ 100% effort – (Push Start) - (record time)**

Bike Step Test:

The bike test is a modified version of the standard step test used in lab testing to determine the lactate threshold of a cyclist. The modifications are designed to give the tester an idea of where an athlete's lactate threshold is without the need for invasive blood sampling or added expense of laboratory testing.

Required Equipment

- *CompuTrainer or Wattage Controlled Bike*
- *Heart Rate Monitor*
- *Athlete's personal bike*
- *Recording Chart (to record wattage, breathing rate and heart rate every 2 minutes)*
- *Hydration for the athlete*

Pre Test Set-up

To ensure that accurate results are gained from the testing session the CompuTrainer needs to be both warmed up and well calibrated. To achieve this make sure that the subject does an easy 10min warm up prior to beginning the test at 80-100w for women and 130-150w for men. Once this warm up is complete calibrate your CompuTrainer by following the instructions in the manual.

Safety

Safety is the primary concern when performing a test to failure, so be prepared to stop the test if the athlete looks distressed or if they choose to stop the test. **Never** push the athlete beyond what they are comfortable doing.

Prior to beginning, provide the athlete with an overview of the test protocol and expectations. Be sure to express that they can cease the test at any time. Ensure athletes have signed a waiver and are aware of the inherent risk of high intensity testing. Athletes under 18 must have a parent/guardian sign on their behalf.

Junior Elite Men

- **Record heart rate prior to test**
- **Begin test at 150w**
- **Record heart rate (HR) and breathing rate (BR) after 2 minutes**
- **Once HR and BR are recorded, increase wattage by 10w to 160w**
- **After 2 minutes record HR and BR, then increase wattage by 10w to 170w**
- **Continue this process until the athlete can no longer continue to maintain a cadence of 85-100rpm, they choose to stop, or the tester stops the test**

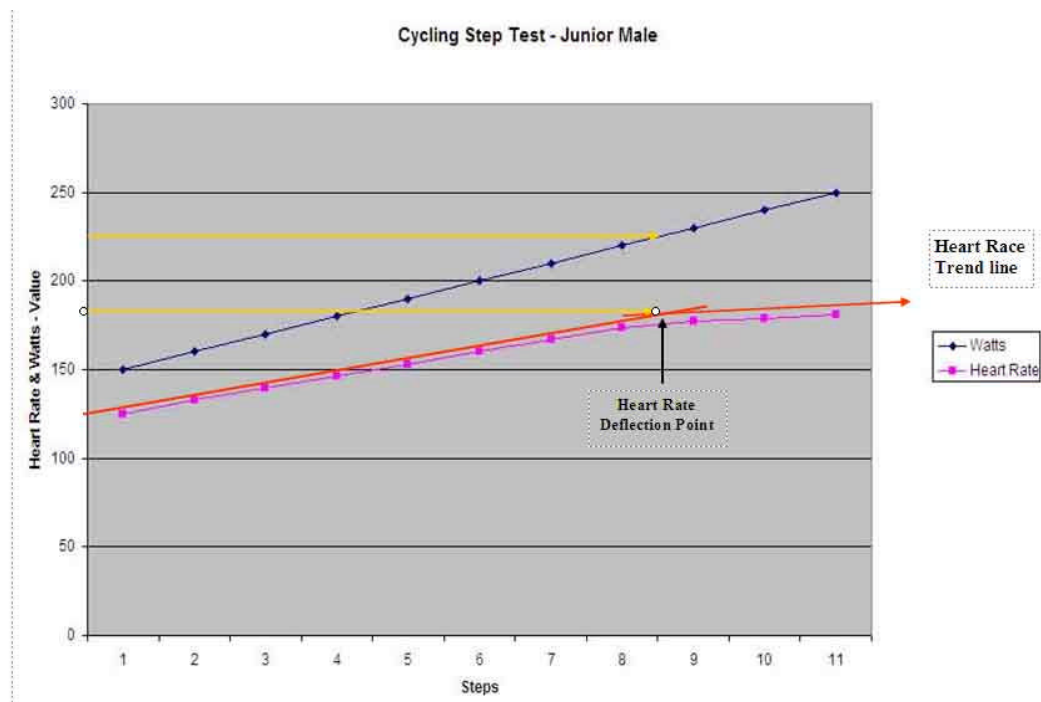
Junior Elite Women

- **Record heart rate prior to test**
- **Begin test at 100w**
- **Record heart rate (HR) and breathing rate (BR) after 2 minutes**
- **Once HR and BR are recorded, increase wattage by 10w to 110w**
- **After 2 minutes record HR and BR, then increase wattage by 10w to 120w**
- **Continue this process until the athlete can no longer continue to maintain a cadence of 85-100rpm, they choose to stop, or the tester stops the test**

How to determine Lactate Threshold from the test:

There are two key things to look for when doing this test:

1. Increase in breathing rate: Due to the nature of anaerobic metabolism, when an athlete begins to exceed threshold there is a sudden increase in breathing rate (number of breaths per minute). There is also an associated increase in sweating as well as redness of the skin and face.
2. When the data is graphed post session there is traditionally a linear increase in heart rate relative to wattage up until the Anaerobic Threshold point. At this point heart rate increase begins to lessen. This is known as the deflection point and is a good indicator of an athlete's cycling anaerobic threshold. This point can be seen on the graph below.



From graphing both heart rate and wattage and looking for the “heart rate deflection point” we can determine both the athlete’s heart rate at threshold as well as wattage at threshold. This point should also match up with your observation during the test for increased breathing rate.

Bike/Run Test set

The goal of the bike/run test is to simulate the feeling of running with fatigued legs. A number of countries around the world use running time trials as a selection tool for national teams. However, this method does not take into account the effort that athletes have to put into the bike leg of a triathlon prior to the run. A pure run test only benefits runners whereas a bike/run test on the other hand benefits true triathletes.

There are two testing protocols listed below for both male and female athletes: one designed for the national/international level (more competitive, advanced) athlete and the other for regional level athletes. Both tests encompass the same bike time and run distance. The difference, however, is wattage output that is expected on the bike section of the test for the different groups. Results using lower wattages (Regional recommendation) are for self comparisons only and cannot be submitted to USAT as a Benchmark score.

National/International level Bike/Run Test

- 30min @ 85-100rpm @ 190w (women) or 260w (men)
- Transition (must be less than 15sec)
- 3km or 2mile Running Time Trial (a track is preferable such that 800m, 1k or 1mi splits can be taken)

Regional Level Bike/Run Test: *for self comparison only, not eligible for submission*

- 30min @ 85-100rpm @ 160w (women) or 230w (men)
- Transition (must be less than 15sec)
- 3km or 2mile Running Time Trial (a track is preferable such that 800m, 1k or 1mi splits can be taken)

JUNIOR BENCHMARKS

Swimming 200/800 Test Set

				200	200
				Yards SC	Meters SC
<u>Junior Women</u>					
World Class	-	World Champs Pack 1	=	2:08:00	2:22:00
International Class	-	World Champs Pack 2	=	2:15:00	2:30:00
National Level	-	National Champs Pack 1	=	2:12:00	2:27:00
National Level	-	National Champs Pack 2	=	2:30:00	2:47:00
National Level	-	National Champs Pack 3	=	2:40:00	2:58:00

				800	800
				Yards SC	Meters SC
<u>Junior Women</u>					
World Class	-	World Champs Pack 1	=	8:40:00	9:33:00
International Class	-	World Champs Pack 2	=	9:23:00	10:32:00
National Level	-	National Champs Pack 1	=	8:55:00	9:48:00
National Level	-	National Champs Pack 2	=	9:45:00	10:45:00
National Level	-	National Champs Pack 3	=	10:20:00	11:20:00

				200	200
				Yards SC	Meters SC
<u>Junior Men</u>					
World Class	-	World Champs Pack 1	=	1:57:00	2:10:00
International Class	-	World Champs Pack 2	=	2:05:00	2:19:00
National Level	-	National Champs Pack 1	=	2:03:00	2:17:00
National Level	-	National Champs Pack 2	=	2:15:00	2:30:00
National Level	-	National Champs Pack 3	=	2:25:00	2:47:00

				800	800
				Yards SC	Meters SC
<u>Junior Men</u>					
World Class	-	World Champs Pack 1	=	8:15:00	9:05:00
International Class	-	World Champs Pack 2	=	8:40:00	9:32:00
National Level	-	National Champs Pack 1	=	8:32:00	9:22:00
National Level	-	National Champs Pack 2	=	9:00:00	9:54:00
National Level	-	National Champs Pack 3	=	9:25:00	10:20:00

***Remember swim times are based on swimming the 200 and 800 being performed with a 1 minute rest period between them not independently of each other. Therefore the 800 is performed in a semi-fatigued state.

Cycling Step Test

The benchmarks below include two separate values. The first value (watts at threshold) identifies the power output respective of the class of rider listed. The second value (watts/kg at threshold) identifies this power output as a relation to the athlete's weight. The reason for this distinction is that weight plays a major role in determining a cyclist's ability on hilly course. This will be practically relevant during a season in which priority races are conducted on hilly courses.

Junior Women (e.g., 55kg / 121 lb female)

	Watts@ Threshold	Watts/kg @ Threshold
World Class Junior Female	230w	4.18w/kg
International Class Junior Female	215w	3.90w/kg
National Class Junior Female	200w	3.64w/kg
Regional Level Junior Female	175w	3.18w/kg

Junior Men (e.g., 65kg / 143lb male)

	Watts@ Threshold	Watts/kg @ Threshold
World Class Junior Male	310w	4.76w/kg
International Class Junior Male	285w	4.38w/kg
National Class Junior Male	260w	4.00w/kg
Regional Level Junior Male	240w	3.69w/kg

Bike/Run Test Set

Junior Women

	3km Time	2 Mile Time	5km pace
World Class Junior Female	9:50min	10:34min	17:10min
International Class Junior Female	10:19min	11:05min	18:00min
National Class A Junior Female	10:53min	11:42min	19:00min
National Class B Junior Female	11:45min	12:37min	20:30min
Regional Level Junior Female	12:19min	13:14min	21:30min

Junior Men

	3km Time	2 Mile Time	5km pace
World Class Junior Male	8:47min	9:26min	15:20min
International Class Junior Male	9:10min	9:51min	16:00min
National Class A Junior Male	9:27min	10:09min	16:30min
National Class B Junior Male	10:02min	10:46min	17:30min
Regional Level Junior Male	10:45min	11:33min	18:45min

*Running times are based on "off the bike" run times at major national and international events; these times are designed to be used in conjunction with the *National/International* bike/run test protocols and not as a straight run time trial. Results using lower wattages (*Regional* recommendation) are for self comparisons only and cannot be submitted for Benchmark scores.