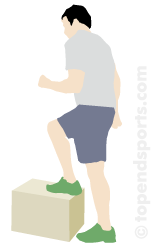
When selecting a VO2MAX protocol, it is important to understand several things:

* Equipment needed vs equipment available: treadmill, heart rate monitor, step, metronome, etc.
* Your client:
  + Risk stratification or mobility issues: knee problems? use a bike instead of a step; on blood pressure medication? do a submaximal versus a maximal test protocol
  + Exercise habits/experience: if your client is an avid runner, you wouldn’t use a cycle ergometer or step test protocol, you’d use a treadmill
  + Weight: an overweight individual may have stability problems, thus a step test or treadmill test may not be appropriate
  + Age: same for an older adult with mobility/stability problems

Before starting any test, be sure you have taken:

* Medical health history and Risk Stratification
* Resting heart rate and blood pressure
* Clients age, height, weight, sex

Protocol:

1. Equipment needed:
   1. 16.25inch (41.3cm) bench/box/step
   2. metronome
   3. stop watch
   4. heart rate monitor or ability to measure radial pulse
2. The client will step at a rate of 22 steps per minute (women; 88 beats per minute on a metronome) or 24 steps per minute (men; 96 beats per minute on a metronome) for three minutes. Step count is on a four-step cadence (up-up-down-down). Each time the person places a foot on a surface (floor or step) counts as a “step”.
3. Allow a brief practice period of five to ten seconds to familiarize your client with the stepping cadence.
4. Begin the test and have the client perform the step-ups for exactly three minutes.
5. Upon completion of the three minutes, have your client remain standing. Five seconds after the test stops take their heart rate for a 15-second interval. Convert recovery heart rate to beats per minute (multiply 15-second heart rate by 4).
6. Maximal oxygen uptake in ml/kg/min is estimated according to the following equations:
   1. Men: maximal oxygen uptake = 111.33 - (0.42 \* recovery heart rate in bpm)
   2. Women: maximal oxygen uptake = 65.81 - (0.1847 \* recovery heart rate in bpm)

Example: The recovery fifteen-second heart rate for a male subject following the three-minute step test is found to be 39 beats.

Maximal oxygen uptake is estimated as follows:

Fifteen-second heart rate = 39 beats

Minute heart rate = 39 \* 4 = 156 bpm

Maximal oxygen uptake =111.33-(0.42\*156) = 45.81 ml/kg/min.