LAB 3.2 • ASSESSING YOUR CARDIORESPIRATORY FITNESS LEVEL

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Materials: Calculator, 12-inch step, stopwatch, metronome

Purpose: To measure (1) recovery from physical activity, (2) walking speed, and (3) current level of cardiorespiratory fitness.

SECTION I: THE THREE-MINUTE STEP TEST

For this test, you will be stepping on a 12-inch high step bench for three minutes and then measuring your recovery pulse for one full minute.

1. **Setup and preparation.** Set up a 12-inch-high step bench in a place that will be safe to perform the test. Set the metronome to a pace of 96 beats per minute, which means you will be doing 24 steps up and down in a minute. Listen to the metronome and do a couple of practice steps to ensure that you can step with the right cadence ("up, up, down, down"). One foot will be stepping up or down with each beat of the metronome. Have a stopwatch available to time your three minutes on the step and your one minute HR afterward.
2. **Step up and down for three minutes.** Start the metronome and march in place to the beat. Start stepping up on the bench and down to the floor after starting the stopwatch. Maintain this exact pace for the entire three minutes.
3. **Stop and count your pulse for one full minute.** At the end of three minutes, stop stepping, turn off the metronome, sit down on your bench, and find your carotid or radial pulse immediately. Within five seconds of stopping the exercise, start counting your recovery pulse and count for one full minute.
4. **Record your results and your fitness rating.** Record your recovery heart rate below in beats per minute (bpm). Locate your fitness rating on the chart below and record that as well.

The 3-Minute Step Test RESULTS

1-Minute Recovery HR: 117 **(bpm)** **Fitness Rating:** Below Average

YMCA 3-Minute Step Test Ratings (bpm)							
Men	Excellent	Good	Above Average	Average	Below Average	Poor	Very Poor
18–25 yrs	50–76	79–84	88–93	95–100	102–107	111–119	124–157
26–35 yrs	51–76	79–85	88–94	96–102	104–110	114–121	126–161
36–45 yrs	49–76	80–88	92–98	100–105	108–113	116–124	130–163
46–55 yrs	56–82	87–93	95–101	103–111	113–119	121–126	131–159
56–65 yrs	60–77	86–94	97–100	103–109	111–117	119–128	131–154
66+ yrs	59–81	87–92	94–102	104–110	114–118	121–126	130–151

YMCA 3-Minute Step Test Ratings (bpm)							
Women	Excellent	Good	Above Average	Average	Below Average	Poor	Very Poor
18–25 yrs	52–81	85–93	96–102	104–110	113–120	122–131	135–169
26–35 yrs	58–80	85–92	95–101	104–110	113–119	122–129	134–171
36–45 yrs	51–84	89–96	100–104	107–112	115–120	124–132	137–169
46–55 yrs	63–91	95–101	104–110	113–118	120–124	126–132	137–171
56–65 yrs	60–92	97–103	106–111	113–118	119–127	129–135	141–174
66+ yrs	70–92	96–101	104–111	116–121	123–126	128–133	135–155

SECTION II: THE ONE-MILE WALK TEST

You will walk one mile and determine your heart rate response to the exercise immediately after. IMPORTANT REMINDERS: The accuracy of this test depends on three things: (1) Walk during this test. Do not run. (2) Walk the mile as fast as you can. (3) Keep a steady pace throughout the mile. Do not "sprint" at the end.

1. **Preparation and warm-up.** Make sure that you have an accurate one-mile course to complete (four laps around a standard track) and a stopwatch. Warm up with three to five minutes of light walking and range-of-motion activities.

2. **Walk one full mile as fast as you can.** After completing the one mile, record your finish time (from your watch, stopwatch, or someone calling out the time) below. Convert the time from minutes and seconds to minutes with a decimal fraction.

3. **Immediately take an exercise heart rate and cool-down.** Within five seconds of finishing the walk, find your carotid or radial pulse and count your pulse for 10 seconds. Multiply the number by 6 and record your HR below. After recording your finish time and your HR, cool down by walking slowly for another five minutes and doing some light stretching.

4. **Calculate your estimated maximal oxygen consumption (VO_2max).** Use the formula below to calculate your estimated VO_2max. This number will more accurately reflect your fitness level if you followed the test instructions carefully.

5. **Find the cardiorespiratory fitness level that corresponds to your predicted VO_2max.** Use the chart at the end of Section III to determine your cardiorespiratory fitness level, as determined by this one-mile walking test.

The One-Mile Walk Test RESULTS

One-Mile Walk Time: ____:____ (min:sec); divide sec by 60 = 0.00 (min w/decimal)

Exercise HR: _____ (beats) × 6 = 0 (bpm)

(10 sec count)

Estimated VO_2max: Use the following equation to estimate VO_2max, where gender = 0 for female and 1 for male; time = walk time to the nearest hundredth of a minute; and HR = heart rate (bpm) at the end of the walking test. Plug in your weight and numbers from above and calculate the numbers in parentheses first. Complete the calculation to find your estimated VO_2max.

- VO_2max = 132.853 − [0.0769 × body weight (lb)] − [0.3877 × age (yr)] + [6.3150 × gender] − [3.2649 × time (min)] − [0.1565 × HR (bpm)]

- $VO_2max = 132.853 - [0.0769 \times$ _____ (lb)$] - [0.3877 \times$ _____ (yr)$] + [6.3150 \times$ Select _____ (gender)$] - [3.2649 \times$ 0.00 _____ (min)$] - [0.1565 \times$ 0 _____ (bpm)$]$
- $VO_2max = 132.853 -$ _____ $-$ _____ $+$ 12.63 _____ $-$ _____ $-$ _____
- $VO_2max =$ 145.48 _____ (ml/kg·min) **Calculate**

Walk Test VO_2max Fitness Rating: _____

SECTION III: 1.5-MILE RUN TEST

1. **Preparation and warm-up.** Make sure that you have an accurate 1.5-mile course to complete (six laps around a standard track) and a stopwatch. Warm up with 5 to 10 minutes of walking/jogging and range-of-motion activities.

2. **Run (with walk breaks if needed) 1.5 miles as fast as you can.** After reaching 1.5 miles, mark your finish time (from your watch, stopwatch, or someone calling out the time) below. Convert the time from minutes and seconds to minutes with a decimal fraction.

3. **Cool-down.** After recording your finish time, cool down by walking for five minutes and doing some light stretching.

4. **Calculate your estimated maximal oxygen consumption (VO_2max).** Use the formula below to calculate your estimated VO_2max.

5. **Find your cardiorespiratory fitness level that corresponds to your predicted VO_2max.** Use the chart at the end of this section to determine your cardiorespiratory fitness level, as determined by this 1.5-mile running test.

The 1.5-Mile Run Test RESULTS

1.5-Mile Run Time: 0 : 0 (min:sec); divide sec by 60 = 0.00 _____ (min w/decimal)

Estimated VO_2max: You will use the following equation to estimate VO_2max, where time = run time to the nearest hundredth of a minute. Plug in your time from above, compute the number in parentheses first, and complete the calculation to find your estimated VO_2max.

- $VO_2max = [483 \div$ time (min)$] + 3.5$
- $VO_2max = [483 \div$ 0.00 _____ (min)$] + 3.5$
- $VO_2max =$ _____ $+ 3.5$
- $VO_2max =$ _____ (ml/kg·min)

Run Test VO_2max Fitness Rating: Select _____

Estimated VO_2max Fitness Ratings (ml/kg·min)						
Men	Superior	Excellent	Good	Fair	Poor	Very Poor
18–29 yrs	>56.1	51.1–56.1	45.7–51.0	42.2–45.6	38.1–42.1	<38.1
30–39 yrs	>54.2	48.9–54.2	44.4–48.8	41.0–44.3	36.7–40.9	<36.7
40–49 yrs	>52.8	46.8–52.8	42.4–46.7	38.4–42.3	34.6–38.3	<34.6
50–59 yrs	>49.6	43.3–49.6	38.3–43.2	35.2–38.2	31.1–35.1	<31.1
60–69 yrs	>46.0	39.5–46.0	35.0–39.4	31.4–34.9	27.4–31.3	<27.4

Estimated VO_2max Fitness Ratings (ml/kg·min)						
Women	**Superior**	**Excellent**	**Good**	**Fair**	**Poor**	**Very Poor**
18–29 yrs	>50.1	44.0–50.1	39.5–43.9	35.5–39.4	31.6–35.4	<31.6
30–39 yrs	>46.8	41.0–46.8	36.8–40.9	33.8–36.7	29.9–33.7	<29.9
40–49 yrs	>45.1	38.9–45.1	35.1–38.8	31.6–35.0	28.0–31.5	<28.0
50–59 yrs	>39.8	35.2–39.8	31.4–35.1	28.7–31.3	25.5–28.6	<25.5
60–69 yrs	>36.8	32.3–36.8	29.1–32.2	26.6–29.0	23.7–26.5	<23.7

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You may also use the chart below to estimate your fitness level using only your run time.

Estimated Run Time Ratings				
Men	**Excellent**	**Good**	**Fair**	**Poor**
Ages 20–29	<10:10	10:10–11:29	11:30–12:38	>12:38
Ages 30–39	<10:47	10:47–11:54	11:55–12:58	>12:58
Ages 40–49	<11:16	11:16–12:24	12:25–13:50	>13:50
Ages 50–59	<12:09	12:09–13:35	13:36–15:06	>15:06
Ages 60–69	<13:24	13:24–15:04	15:05–16:46	>16:46
Women	**Excellent**	**Good**	**Fair**	**Poor**
Ages 20–29	<11:59	11:59–13:24	13:25–14:50	>14:50
Ages 30–39	<12:25	12:25–14:08	14:09–15:43	>15:43
Ages 40–49	<13:24	13:24–14:53	14:54–16:31	>16:31
Ages 50–59	<14:35	14:35–16:35	16:36–18:18	>18:18
Ages 60–69	<16:34	16:34–18:27	18:28–20:16	>20:16

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To submit the completed lab, save the form to your computer and email it to your instructor or upload it to their digital dropbox as directed.