

LAB ACTIVITY 4-1 Assessing Your Cardiorespiratory Fitness

 SUBMIT ONLINE

NAME

DATE

SECTION

This lab includes three field tests for assessing cardiorespiratory endurance:

1. Rockport 1-mile walk test
2. 1.5-mile run/walk test
3. 3-minute step test

These three tests provide results in terms of VO_{2max} . Choose the test that best fits your current fitness status and the equipment you have available. The 1.5 mile run/walk test is best suited for people who can jog for 15 minutes and have some experience pacing themselves. For people with lower fitness or less running experience, the walk test or the step test is probably a better choice. A partner is helpful to time you, but you can perform the tests on your own, timing yourself. The 3-minute step test is just as reliable when self-administered as it is under the supervision of trained personnel. Refer to the information about safety of exercise in Chapter 3 if you have any questions about whether CRF testing is appropriate for you.

Rockport 1-Mile Walk Test

Equipment:

- A flat track or course that provides a measurement of 1 mile
- Stopwatch, clock, or watch with a second hand
- Weight scale
- Partner to time you (optional)

Preparation:

Perform a general warm-up. Weigh yourself and record the result. Weight: lbs.

Instructions:

1. **Walk the 1-mile course as fast as possible without breaking into a run.** Record the time it takes you to walk the mile in minutes and seconds.

Time: minutes seconds

2. **As soon as you finish the 1-mile walk, count your pulse for 15 seconds.**

15-second pulse count: beats

3. **Cool down after the test.**

Results:

1. **Convert your weight in pounds to kilograms:** lbs. \div 2.2 = kilograms

2. **Convert your 1-mile walk time in minutes and seconds to a decimal value (the nearest hundredth of a minute).** For example, a time of 13 minutes and 12 seconds would be $13 + (12 \div 60)$, or 13.2.

Time: minutes + (seconds \div 60) =

3. **Multiply your 15-second pulse count by 4 to determine your 1-minute recovery heart rate.**

Recovery heart rate (RHH): 15-second pulse count \times 4 = beats per minute (bpm)

4. Enter your values into the equation below; for gender, enter 1 if you are male and 0 if you are female.

$$VO_{2\max} = 132.853 - (0.1692 \times \text{weight } \boxed{} \text{ kg}) - (0.3877 \times \text{age } \boxed{} \text{ years}) + (6.315 \times \text{gender } \boxed{}) - (3.2649 \times \text{time } \boxed{} \text{ minutes}) - (0.1565 \times \text{RHH } \boxed{} \text{ bmp}) = \boxed{} \text{ ml/kg/min.}$$

5. Find the rating for your $VO_{2\max}$ value from the table.

Rating:

MAXIMAL OXYGEN CONSUMPTION ($VO_{2\max}$) RATINGS*

Males

AGE (YEARS)	WELL ABOVE AVERAGE	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	WELL BELOW AVERAGE
20–29	>51.1	45.8–51.1	42.3–45.7	38.1–42.2	<38.1
30–39	>47.5	44.4–47.5	41.0–44.3	36.7–40.9	<36.7
40–49	>46.8	42.4–46.8	38.4–42.3	34.6–38.3	<34.6
50–59	>43.3	38.3–43.3	35.2–38.2	31.1–35.1	<31.1
60+	>39.5	35.0–39.5	31.4–34.9	27.4–31.3	<27.4

Females

AGE (YEARS)	WELL ABOVE AVERAGE	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	WELL BELOW AVERAGE
20–29	>44.0	39.5–44.0	35.5–39.4	31.6–35.4	<31.6
30–39	>41.0	36.7–41.0	33.8–36.6	29.9–33.7	<29.9
40–49	>38.9	35.1–38.9	31.6–35.0	28.0–31.5	<28.0
50–59	>35.2	31.4–35.2	28.7–31.3	25.5–28.6	<25.5
60+	>32.3	29.1–32.3	26.6–29.0	23.7–26.5	<23.7

*In terms of percentiles, well above average = over the 80th percentile; above average = between 60th and 80th percentiles; average = between 40th and 60th percentiles; below average = between 20th and 40th percentiles; and well below average = below the 20th percentile.

Source: Cooper Institute for Aerobics Research. *Physical fitness assessment and norms*. Dallas, TX: Cooper Institute. For more information: <http://www.cooperinstitute.org>.

1.5-Mile Run/Walk Test

Equipment:

- A flat track or course that provides a measurement of 1.5 miles
- Stopwatch, clock, or watch with a second hand
- Partner to time you (optional)

Preparation:

Perform a general warm-up that includes brisk walking or slow jogging.

Instructions:

Cover the 1.5-mile course as quickly as possible. Take care to pace yourself, as careful pacing can significantly affect your time; don't overexert yourself at the start. You can alternate walking with jogging or running if needed. Record the time it takes you to complete the 1.5-mile distance in minutes and seconds. Cool down after you complete the test.

Time: minutes seconds

Results:

1. **Convert your 1.5-mile run/walk time in minutes and seconds to a decimal value (the nearest hundredth of a minute).** For example, a time of 11 minutes and 12 seconds would be $11 + (12 \div 60)$, or 11.2.

Time: minutes + (seconds \div 60) =

2. **Enter your time into the equation below:**

$VO_{2\max} = 3.5 + (483 \div \text{time } \text{minutes}) = \text{ml/kg/min.}$

3. **Find the rating for your $VO_{2\max}$ value from the table in the section on the 1-mile walk test.**

Rating:

3-Minute Step Test**Equipment:**

- 16.25-inch step
- Stopwatch or clock with a second hand
- Metronome (these can be found at music stores; free versions are also available online)

Preparation:

Warm up before taking the test. Check your equipment: Make sure the step is stable and wide enough to step up and down on comfortably and safely. Set the metronome cadence as follows:

- Women: 88 beats per minute
- Men: 96 beats per minute

Place the metronome close enough so that you can hear it throughout the test, above the sound of your stepping. Take a few practice steps. Start with both feet on the ground and then with each beat, step in this pattern: up-up-down-down. At this pace, women will complete 22 step cycles per minute and men will complete 24 step cycles per minute. You can lead with either foot and can change lead legs at any time during the test.

Practice your step technique until you are comfortable with it. During the test, you will step for 3 minutes and then stop and take your pulse for 15 seconds. As you practice your stepping technique, also practice taking your pulse; you can take your pulse at the radial artery in your wrist or the carotid artery in your neck.

Instructions:

Once your equipment is set and you are comfortable with the technique, you are ready to begin. Step up and down for a total of 3 minutes. At the end of the test, remain standing and count your pulse for 15 seconds; start counting your pulse 5 seconds into the recovery period (if you keep the stopwatch running, you would count from 3:05 to 3:20). Note your 15-second pulse count. Then cool down for several minutes.

Results:

1. **15-second pulse count:** beats

2. **Convert your 15-second pulse count into a 1-minute pulse count**

15-second pulse count beats \times 4 = beats per minute (bpm)

3. Enter your 1-minute pulse count into the appropriate formula below.

Women: $VO_{2max} = 65.81 - (0.1847 \times \boxed{} \text{ bpm}) = \boxed{} \text{ ml/kg/min}$

Men: $VO_{2max} = 111.33 - (0.42 \times \boxed{} \text{ bpm}) = \boxed{} \text{ ml/kg/min}$

4. Find the rating for your VO_{2max} value from the table in the section on the 1-mile walk test.

Rating:

Reflecting on Your Results:

Copy your results into the chart at the right.
Are you surprised with your overall rating?
Did your results match what you thought about your own cardiorespiratory fitness?

	VO_{2MAX} (ML/KG/MIN.)	RATING
Rockport 1-mile walk test		
1.5-mile run/walk test		
3-minute step test		

Planning Your Next Steps:

Cardiorespiratory fitness (CRF) is typically a function of training. If your scores were lower than you expected—or want—then it's time to change your activity routine or to start one. If you scored well, then strive to maintain your current level of fitness, or add some new or more advanced activities or training techniques to boost your results and add variety to your program. Set realistic goals for improvement and create a plan to achieve them. Then, in 6–10 weeks, repeat the same CRF tests you completed and note any improvements.

Describe your goals and the specific steps you will take to improve your cardiorespiratory fitness. If needed, refer to Lab Activity 4-2 on program planning.

What effect, if any, did your actions have on your CRF level? Was your plan effective? Why or why not?

Sources: Protocols and formulas for Rockport 1-mile walk test and 1.5-mile run/walk test: American College of Sports Medicine. (2008). *Health-Related Physical Fitness Assessment Manual* (2nd ed.). Philadelphia: Lippincott Williams & Wilkins.
Formula for calculation of VO_{2max} for the 3-minute step test: McArdle, W.D., Katch, F.L., Pechar, G.S., Jacobson, L., & Ruck, S. (1972). Reliability and interrelationships between maximal oxygen intake, physical work capacity, and step-test scores in college women. *Medicine and Science in Sports and Exercise*, 4(4): 182–186.
Liguori, G., & Mozumdar, A. (2009). Reliability of self-assessments for a cardiovascular fitness assessment. *International Journal of Fitness*, 5(1).