

APPENDIX I. REFERENCE RANGES FOR VO₂ MAX

Males ages 12-19

Low	< 42
Moderate	42 – 51.99
High	≥ 52

Females ages 12

Low	<37
Moderate	37-45.99
High	≥ 46

Females ages 13

Low	<36
Moderate	36-44.99
High	≥ 45

Females ages 14

Low	<35
Moderate	35-43.99
High	≥ 44

Females ages 15-19

Low	<35
Moderate	35 – 42.99
High	≥ 43

Males ages 20-29

Low	≤ 37.13
Moderate	37.14-44.22
High	≥ 44.23

Females ages 20-29

Low	≤ 30.63
Moderate	30.64-36.64
High	≥ 36.64

Males ages 30-39

Low	≤ 35.35
Moderate	35.36-42.41
High	≥ 42.42

Females ages 30-39

Low	≤ 28.70
Moderate	28.71-34.59
High	≥ 34.60

Males ages 40-49

Low	≤ 33.04
Moderate	33.05-39.88
High	≥ 39.89

Females ages 40-49

Low	≤ 26.54
Moderate	26.55-32.30
High	≥ 32.31

The level of cardiovascular fitness is categorized based on gender-age specific cut-points of estimated VO₂ max. The reference cut-points used for adults 20-49 years are based on data from the Aerobics Center Longitudinal Study (ACLS).^{1,2} Low level of CV fitness is defined as an estimated VO₂ max below the 20th percentile of the ACLS data of the same gender and age group; moderate fitness is defined as a value between the 20th and 59th percentile, and high fitness level is defined as at or above the 60th percentile. The reference standards used for adolescents and young adults 12-19 years are based on the criteria used in the FITNESSGRAM program.^{3,4}

Report of Findings statement: “Compared with other people of your age and sex, your cardiovascular fitness level is *<low, moderate, high>*.”

References

1. American College of Sports Medicine. (1995). *ACSM's Guidelines for Exercise Testing and Prescription*, 6th edition. Philadelphia, PA: Lippincott Williams and Wilkins Company.
2. Blair, S.N., Kohl, H.W. 3rd, Paffenbarger, R.S. Jr., et al. (1989). *Physical Fitness and All-Cause Mortality. A Prospective Study of Healthy Men and Women*. JAMA, 262(17), 2395-401.
3. Cureton, K.J. and Warren, G.L. (1990). *Criterion-Referenced Standards for Youth Health-Related Fitness Tests: A Tutorial*. Research Quarterly for Exercise and Sport, 61(1), 7-19.
4. Cureton, K.J. and Plowman, S.A. (1999). *Aerobic Capacity Assessments*. In Welk G.J., Morrow, J.R. Jr., and Falls H.B. (Ed.) *Fitnessgram Reference Guide* (pp. 66-86). Dallas, TX: Cooper Institute. Available at: <http://dev.cooperinst.org/shopping/PDF%20format/Fitnessgram%20Reference%20Guide.pdf>