

Fitness Tests
Division of Physical Activity & Health
Eastern Oregon University
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The tests described in this document are physically demanding. Individuals must complete the PAR Q instrument and, if there are any concerns, consult a physician and their instructor before completing these tests. Before the actual test, students should attempt the activity at a moderate intensity to practice the procedures and determine readiness for the actual test.

Eastern Oregon University graduates must pass the following fitness test battery at the 65th percentile:

- 1 cardiovascular test
 - 2 strength tests (for different muscle groups)
 - 1 flexibility test
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CARDIOVASCULAR TEST

1.5 Mile Run Protocol (See Tables 1 & 2 for norms)

1. Participants should not eat a heavy meal or smoke for at least 2-3 hours prior to the test. Participants should warm up and stretch thoroughly prior to the test.
2. If possible, each subject should have experienced some practice in pacing prior to the test. Often subjects will attempt to run too fast early in the run and become fatigued prematurely. A trained pacer might accompany the participants around the track during the actual test.
3. The participant runs 1.5 miles as fast as possible. If a 440 yard track is used, 6 laps must be completed using the inside lane (lane 1). If using a 400 meter track, an additional 15 yards must be run after the 6 laps are completed. [Most modern tracks are 400 meter so unless the track distance is verified as a quarter mile (440 yards), complete an extra 15 yards for the timed distance.]
4. During the administration of the test, the participants can be informed of their lap times. Finish times should be called out and recorded.
5. Upon test completion, a mandatory cool down period is enforced. The participants should walk slowly for about 5 minutes immediately after the run to prevent venous pooling (i.e., pooling of the blood in the lower extremities which reduces the return of blood to the heart and may cause cardiac arrhythmias). (The Cooper Institute, 2005, p. 11)

1.0 Mile Walk Test Protocol (See Tables 9 for VO₂max norm)

1. Select a standardized testing site. If a 440 yard track is used, 4 laps must be completed using the inside lane (lane 1). If using a 400 meter track, an additional 10 yards must be walked after the 4 laps are completed. [Most modern tracks are 400 meter so unless the track distance is verified as a quarter mile (440 yards), complete an extra 10 yards for the timed distance.]
2. Determine body weight in pounds prior to the test.
3. A stopwatch must be available to determine the time of the mile walk and take heart rate.

4. Walk the mile course at a brisk pace (heart rate should be above 120 at end).
5. Upon completion of the mile walk, record time of the performance and immediately take heart rate for 10 seconds. Multiply by 6 to obtain beats per minute. A heart rate monitor may be used to record heart rate immediately.
6. Convert walking time from minutes and seconds to minute units. Because each minute has 60 seconds, divide seconds by 60 to obtain a fraction of a minute.
7. To obtain estimated maximal oxygen uptake (VO_{2max}), in ml/kg/min, use the following formula for college age students:

$$VO_{2max} = 88.768 - (0.0957 \times \text{weight in pounds}) + (8.892 \times [0 \text{ for female, } 1 \text{ for male}]) - (1.4537 \times \text{time minutes}) - (0.1194 \times \text{heart rate})$$

(Hoeger & Hoeger, 2002)

Alternative Tests

The following are approved tests if the established protocol is strictly followed:

- 12-minute or 9-minute run
- 12-Minute Swimming Test
- 12-Minute Cycling Test
- Queens College Step Test
- Harvard Step Test
- YMCA 3-Minute Step Test
- Laboratory VO_2 Max Test

Other tests and norms may be pre-approved by an EOU instructor before testing. To obtain approval, the test protocol, norms, and citations to the original sources must be provided for the instructor to evaluate

STRENGTH TEST

Two strength tests must be completed that address distinctly different muscle groups.

Sit Up Test (See Tables 3 & 5 for norms)

This test measures abdominal muscular endurance

1. The subject starts by lying on the back, knees bent, heels flat on the floor, with the hands cupped behind the ears.
2. A partner holds the feet down firmly.
3. The subject then performs as many correct sit ups as possible in one minute.
4. In the up position, the individual should touch elbows to knees and then return until the shoulder blades touch the floor.
5. Score is total number of correct sit ups. Any resting should be done in the up position.
6. Breathing should be as normal as possible, making sure the subject does not hold their breath as in the Valsalva maneuver.
7. Neck remains in neutral position.
8. Do not pull on the head or neck. (The Cooper Institute, 2005, p. 23)

Push Up Test (See Tables 4, 6 & 7 for norms)

This test measures muscular endurance of the upper body (anterior deltoid, pectoralis major, triceps)

1. The hands are placed slightly wider than shoulder width apart, with fingers pointing forward. The administrator places on fist on the floor below the subject's chest. If a male is testing a female, a 3 inch sponge should be placed under the sternum to substitute for the fist.
2. Starting from the up position (elbows extended), the subject must keep the back straight at all times and lower the body to the floor until the chest touches the administrator's fist. Subject then returns to the up position. This is one repetition. The modified push up is performed on the hands and knees with the back straight and hands slightly in front of the shoulders in the up position.
3. Resting should be done only in the up position. Both hands must remain in contact with the floor at all times.
4. The total number of correct push ups in 1 minute is recorded as the score. (The Cooper Institute, 2005, p. 23)

Alternative Tests

The following are approved tests if the established protocol is strictly followed:

- 1 RM Bench Press, Squat, Leg Press
- Bench Jump
- Modified Dip
- Hand Grip Strength Test
- Abdominal Curls
- Pull-up Test
- Modified Pull-ups
- Flexed-Arm Hang (for women)
- Dip Test for Strength
- Standing Broad Jump
- Baumgartner Modified Pull-Ups Test

Other tests and norms may be pre-approved by an EOU instructor before testing. To obtain approval, the test protocol, norms, and citations to the original sources must be provided for the instructor to evaluate

FLEXIBILITY TEST

Sit And Reach Test (See Tables 8 & 9 for norms)

Equipment

1. 12" box
2. yardstick on box with 15" mark at edge

Procedures

1. The subject should warm up.
2. The shoes must be removed.
3. The feet are placed squarely against the box with the feet no wider than eight inches apart. Toes are pointed directly toward ceiling.
4. The knees remain extended throughout the test.
5. The hands are placed on hand on top of the other, fingertips even.
6. The yardstick is set on the box such that the 15" mark is flush with the edge of the box.
7. The subject leans forward without lunging or bobbing and reaches as far down the yard stick as possible. The hands must stay together and even and the stretch must be held for one second. Neck remains in neutral position.
8. Record the reach to the nearest ¼ inch.
9. Three trials are allowed; the best of the three trials is recorded.
10. Exhaling on the reach is recommended. (The Cooper Institute, 2005, p. 25)

Alternative Approved Tests

The following are approved tests if the established protocol is followed:

- Modified Sit And Reach (Norms available in Table 10)
- Total Body Rotation Test
- Shoulder Rotation Test
- Sit and Reach Wall Test
- Trunk and Neck Extension
- Trunk Extension
- Shoulder-and-Wrist Elevation
- Shoulder Lift

Other tests and norms may be pre-approved by an EOU instructor before testing. To obtain approval, the test protocol, norms, and citations to the original sources must be provided for the instructor to evaluate

REFERENCES

Hoeger, W. W. K., & Hoeger, S. A. (2002). *Principles and Labs for Physical Fitness* (3rd ed.). Belmont, CA: Thomson Wadsworth.

The Cooper Institute. (2005). *Physical Fitness Assessments and Norms*. Dallas, TX: The Cooper Institute.

Table 1

1.5 Mile Run Norms - Males			
	Age		
Percentile	20-29	30-39	40-49
99	8:22	8:49	9:02
95	9:10	9:31	9:47
90	9:34	9:52	10:09
85	9:52	10:14	10:44
80	10:08	10:38	11:09
75	10:34	10:59	11:32
70	10:49	11:09	11:52
65	11:09	11:34	11:58
60	11:27	11:49	12:25
55	11:34	11:58	12:53
50	11:58	12:25	13:05
45	12:11	12:44	13:25
40	12:29	12:53	13:50
35	12:53	13:25	14:10
30	13:08	13:48	14:33

Note. From *Physical Fitness Assessments and Norms*, (p. 29-30), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.

Table 2

1.5 Mile Run Norms - Females			
	Age		
Percentile	20-29	30-39	40-49
99	9:23	9:52	10:09
95	10:20	11:08	11:35
90	10:59	11:43	12:25
85	11:34	12:23	13:14
80	11:56	12:53	13:38
75	12:07	13:08	13:58
70	12:51	13:41	14:33
65	13:01	13:58	15:03
60	13:25	14:33	15:17
55	13:58	14:33	15:56
50	14:15	15:14	16:13
45	14:33	15:35	16:46
40	15:05	15:56	17:11
35	15:32	16:43	17:38
30	15:56	16:46	18:26
<p><i>Note.</i> From <i>Physical Fitness Assessments and Norms</i>, (p. 36-37), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.</p>			

Table 3

1 Minute Sit Up - Males			
	Age		
Percentile	20-29	30-39	40-49
99	>55	>51	>47
95	55	51	47
90	52	48	43
85	49	45	40
80	47	43	39
75	46	42	37
70	45	41	36
65	44	40	35
60	42	39	34
55	41	37	32
50	40	36	31
45	39	36	30
40	38	35	29
35	37	33	28
30	35	32	27

Note. From *Physical Fitness Assessments and Norms*, (p. 33), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.

Table 4

Push Up – Males			
	Age		
Percentile	20-29	30-39	40-49
99	100	86	64
95	62	52	40
90	57	46	36
85	51	41	34
80	47	39	30
75	44	36	29
70	41	34	26
65	39	31	25
60	37	30	24
55	35	29	22
50	33	27	21
45	31	25	19
40	29	24	18
35	27	21	16
30	26	20	15

Note. From *Physical Fitness Assessments and Norms*, (p. 34), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.

Table 5

1 Minute Sit Up - Females			
	Age		
Percentile	20-29	30-39	40-49
99	>51	>42	>38
95	51	42	38
90	49	40	34
85	45	38	32
80	44	35	29
75	42	33	28
70	41	32	27
65	39	30	25
60	38	29	24
55	37	28	23
50	35	27	22
45	34	26	21
40	32	25	20
35	31	24	19
30	30	22	17

Note. From *Physical Fitness Assessments and Norms*, (p. 40), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.

Table 6

Modified Push Up - Females			
	Age		
Percentile	20-29	30-39	40-49
99	70	56	60
95	46	39	33
90	42	36	28
85	39	33	26
80	36	31	24
75	34	29	21
70	32	28	20
65	31	26	19
60	30	24	18
55	29	23	17
50	26	21	15
45	25	20	14
40	23	19	13
35	22	17	11
30	20	15	10

Note. From *Physical Fitness Assessments and Norms*, (p. 41), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.

Table 7

Full Body Push Up - Females			
	Age		
Percentile	20-29	30-39	40-49
99	53	48	23
95	42	39.5	20
90	37	33	18
85	33	26	17
80	28	23	15
75	27	19	15
70	24	18	14
65	23	16	13
60	21	15	13
55	19	14	11
50	18	14	11
45	17	13	10
40	15	11	9
35	14	10	8
30	13	9	7

Note. From *Physical Fitness Assessments and Norms*, (p. 42), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.

Table 8

Sit and Reach - Males			
	Age		
Percentile	20-29	30-39	40-49
99	>23.0	>22.0	>21.3
95	23.0	22.0	21.3
90	21.8	21.0	20.0
85	21.0	20.0	19.3
80	20.5	19.5	18.5
75	20.0	19.0	18.0
70	19.5	18.5	17.5
65	19.0	18.0	17.0
60	18.5	17.5	16.3
55	18.0	17.0	16.0
50	17.5	16.5	15.3
45	17.0	16.0	15.0
40	16.5	15.5	14.3
35	16.0	15.0	14.0
30	15.5	14.5	13.3

Note. From *Physical Fitness Assessments and Norms*, (p. 32), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.

Table 9

Sit and Reach - Female			
	Age		
Percentile	20-29	30-39	40-49
99	>24.5	>24.0	>22.8
95	24.5	24.0	22.8
90	23.8	22.5	21.5
85	23.0	22.0	21.3
80	22.5	21.5	20.5
75	22.0	21.0	20.0
70	21.5	20.5	19.8
65	21.0	20.3	19.1
60	20.5	20.0	19.0
55	20.3	19.5	18.5
50	20.0	19.0	18.0
45	19.5	18.5	18.0
40	19.3	18.3	17.3
35	19.0	17.8	17.0
30	18.3	17.3	16.5

Note. From *Physical Fitness Assessments and Norms*, (p. 39), by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute.

Table 10

Modified Sit and Reach


Percentile Rank	Age Category—Men								Percentile Rank	Age Category—Women							
	≤18		19–35		36–49		≥50			≤18		19–35		36–49		≥50	
	in.	cm	in.	cm	in.	cm	in.	cm	in.	cm	in.	cm	in.	cm	in.	cm	
99	20.8	52.8	20.1	51.1	18.9	48.0	16.2	41.1	99	22.6	57.4	21.0	53.3	19.8	50.3	17.2	43.7
95	19.6	49.8	18.9	48.0	18.2	46.2	15.8	40.1	95	19.5	49.5	19.3	49.0	19.2	48.8	15.7	39.9
90	18.2	46.2	17.2	43.7	16.1	40.9	15.0	38.1	90	18.7	47.5	17.9	45.5	17.4	44.2	15.0	38.1
80	17.8	45.2	17.0	43.2	14.6	37.1	13.3	33.8	80	17.8	45.2	16.7	42.4	16.2	41.1	14.2	36.1
70	16.0	40.6	15.8	40.1	13.9	35.3	12.3	31.2	70	16.5	41.9	16.2	41.1	15.2	38.6	13.6	34.5
60	15.2	38.6	15.0	38.1	13.4	34.0	11.5	29.2	60	16.0	40.6	15.8	40.1	14.5	36.8	12.3	31.2
50	14.5	36.8	14.4	36.6	12.6	32.0	10.2	25.9	50	15.2	38.6	14.8	37.6	13.5	34.3	11.1	28.2
40	14.0	35.6	13.5	34.3	11.6	29.5	9.7	24.6	40	14.5	36.8	14.5	36.8	12.8	32.5	10.1	25.7
30	13.4	34.0	13.0	33.0	10.8	27.4	9.3	23.6	30	13.7	34.8	13.7	34.8	12.2	31.0	9.2	23.4
20	11.8	30.0	11.6	29.5	9.9	25.1	8.8	22.4	20	12.6	32.0	12.6	32.0	11.0	27.9	8.3	21.1
10	9.5	24.1	9.2	23.4	8.3	21.1	7.8	19.8	10	11.4	29.0	10.1	25.7	9.7	24.6	7.5	19.0
05	8.4	21.3	7.9	20.1	7.0	17.8	7.2	18.3	05	9.4	23.9	8.1	20.6	8.5	21.6	3.7	9.4
01	7.2	18.3	7.0	17.8	5.1	13.0	4.0	10.2	01	6.5	16.5	2.6	6.6	2.0	5.1	1.5	3.8

High physical fitness standard
 Health fitness standard

Note. From *Lifetime: Physical Fitness & Wellness*, 8th ed., (p. 226), by W.W.K. Hoegar and S.A. Hoegar, 2005, Belmont, CA: Wadsworth.

Table 11

VO2 Max Norms

 TABLE 4-5. Percentile Values for Maximal Aerobic Power (mL·kg⁻¹·min⁻¹)*					
Percentile	Age				
	20–29	30–39	40–49	50–59	60+
<i>Men</i>					
90	51.4	50.4	48.2	45.3	42.5
80	48.2	46.8	44.1	41.0	38.1
70	46.8	44.6	41.8	38.5	35.3
60	44.2	42.4	39.9	36.7	33.6
50	42.5	41.0	38.1	35.2	31.8
40	41.0	38.9	36.7	33.8	30.2
30	39.5	37.4	35.1	32.3	28.7
20	37.1	35.4	33.0	30.2	26.5
10	34.5	32.5	30.9	28.0	23.1
<i>Women</i>					
90	44.2	41.0	39.5	35.2	35.2
80	41.0	38.6	36.3	32.3	31.2
70	38.1	36.7	33.8	30.9	29.4
60	36.7	34.6	32.3	29.4	27.2
50	35.2	33.8	30.9	28.2	25.8
40	33.8	32.3	29.5	26.9	24.5
30	32.3	30.5	28.3	25.5	23.8
20	30.6	28.7	26.5	24.3	22.8
10	28.4	26.5	25.1	22.3	20.8

*Data provided by Institute for Aerobics Research, Dallas, TX (1994). Study population for the data set was predominately white and college educated. A modified Balke treadmill test was used with $\dot{V}O_{2max}$ estimated from the last grade/speed achieved. The following may be used as descriptors for the percentile rankings: well above average (90), above average (70), average (50), below average (30), and well below average (10).

Table 12

Minimum Standard Summary (65 th Percentile)			
		Group	
Test		Males 20-29	Females 20-29
Cardiovascular	1.5 mile run (Cooper Institute)	11:09	13:01
	Queens College Step Test (Hoegar, p. 169)	<156	<152
	VO2 Max Test (Hoffman, p. 75)	45.5	37.4
Strength	1 min Sit Up (Cooper Institute)	44	39
	Push Up (Cooper Institute)	39	23
	Modified Push Up (Cooper Institute)		31
	Hand Dynamometer (Hoffman, p. 29)	51 kg	33 kg
	1 RM Bench Press (Hoffman, p. 34)	1.18 x mass	0.41 x mass
Flexibility	Sit and Reach (Cooper Institute)	19 inches	21
	Modified Sit and Reach (Hoegar)	38.1 cm	40.1

Note. From *Physical Fitness Assessments and Norms*, by The Cooper Institute, 2005, Dallas, TX: The Cooper Institute. From *Norms for fitness, performance, and health*, by Jay Hoffman, 2006, Champaign, IL: Human Kinetics. From *Lifetime: Physical Fitness & Wellness*, 9th ed., by W.W.K. Hoegar and S.A. Hoegar, 2007, Belmont, CA: Wadsworth. See also *Measurement by the Physical Educator: Why and How* (4th ed.), by D. K. Miller, 2002, New York: McGraw-Hill.