

Used to Derive the Composite Musculoskeletal Fitness Score

MALES

Musculoskeletal Fitness Weighted Scores

Grip Strength	Excellent 8	Very Good 6	Good 4	Fair 2	Needs Improvement 0
Push-ups	Excellent 8	Very Good 6	Good 4	Fair 2	Needs Improvement 0
Sit and Reach	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Partial Curl-Ups	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Leg Power	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Back Extension	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0

FEMALES

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Grip Strength	Excellent 8	Very Good 6	Good 4	Fair 2	Needs Improvement 0
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Leg Power	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Back Extension	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0

FIGURE 7-21

COMPOSITE MUSCULOSKELETAL FITNESS NOMOGRAM

Total Weighted Score Achieved

	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Maximum Weighted Attainable Score	32	4	4	4	4	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0	
	28				4	4	4	4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0	0	0	0	
	24								4	4	4	4	3	3	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	0	0	0	0	
	20												4	4	4	3	3	3	3	3	3	2	2	2	2	2	1	1	1	1	0	0	0	
	16																4	4	4	3	3	3	3	3	2	2	2	1	1	1	1	0	0	0
	12																					4	4	3	3	3	2	2	2	1	1	1	0	0
	8																								4	4	3	3	2	1	1	0	0	
4																												4	3	2	1	0		

FIGURE 7-22

HEALTHY MUSCULOSKELETAL FITNESS

Conversion Between Health Benefit Ratings and Scores

Health Benefit Rating	Symbol	Score
Excellent	E	4
Very Good	VG	3
Good	G	2
Fair	F	1
Needs Improvement	NI	0

FIGURE 7-23

HEALTH BENEFIT ZONES FOR MUSCULOSKELETAL FITNESS

Health Benefit Zone

- Excellent ⤴ Your musculoskeletal fitness falls within a range that is generally associated with optimal health benefits.
- Very Good ⤴ Your musculoskeletal fitness falls within a range that is generally associated with considerable health benefits.
- Good ⤴ Your musculoskeletal fitness falls within a range that is generally associated with many health benefits.
- Fair ⤴ Your musculoskeletal fitness falls within a range that is generally associated with some health risk. *Continuing to progress from here into the GOOD zone and beyond will further increase the health benefits associated with your musculoskeletal fitness.*
- Needs Improvement ⤴ Your musculoskeletal fitness falls within a range that is generally associated with considerable health risks. *Progressing from here into the FAIR zone requires utilizing your major muscle groups more vigorously against resistance two to three times per week. This is a very significant step to increasing the health benefits from musculoskeletal fitness.*

FIGURE 7-18
HEALTHY MUSCULOSKELETAL FITNESS NORMS: MALES
Norms and Health Benefit Zones by Age Bands

Age (yr) 15–19	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥108	≥39	≥39	25	≥56	≥4644	158–180
Very Good	98–107	29–38	34–38	23–24	51–55	4185–4643	135–157
Good	90–97	23–28	29–33	21–22	46–50	3858–4184	119–134
Fair	79–89	18–22	24–28	16–20	42–45	3323–3857	91–118
Needs Improvement	≤78	≤17	≤23	≤15	≤41	≤3322	≤90
Age (yr) 20–29	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥115	≥36	≥40	25	≥58	≥5094	176–180
Very Good	104–114	29–35	34–39	21–24	54–57	4640–5093	133–175
Good	95–103	22–28	30–33	16–20	48–53	4297–4639	99–132
Fair	84–94	17–21	25–29	11–15	42–47	3775–4296	86–98
Needs Improvement	≤83	≤16	≤24	≤10	≤41	≤3774	≤85
Age (yr) 30–39	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥115	≥30	≥38	25	≥52	≥4860	147–180
Very Good	104–114	22–29	33–37	18–24	46–51	4389–4859	109–146
Good	95–103	17–21	28–32	15–17	40–45	3967–4388	91–108
Fair	84–94	12–16	23–27	11–14	31–39	3485–3966	56–90
Needs Improvement	≤83	≤11	≤22	≤10	≤30	≤3484	≤55
Age (yr) 40–49	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥108	≥25	≥35	25	≥43	≥4320	130–180
Very Good	97–107	17–24	29–34	18–24	36–42	3700–4319	84–129
Good	88–96	13–16	24–28	13–17	32–35	3242–3699	71–83
Fair	80–87	10–12	18–23	6–12	26–31	2708–3241	32–70
Needs Improvement	≤79	≤9	≤17	≤5	≤25	≤2707	≤31
Age (yr) 50–59	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥101	≥21	≥35	25	≥41	≥4019	120–180
Very Good	92–100	13–20	28–34	17–24	34–40	3567–4018	88–119
Good	84–91	10–12	24–27	11–16	28–33	2937–3566	54–87
Fair	76–83	7–9	16–23	8–10	18–27	2512–2936	20–53
Needs Improvement	≤75	≤6	≤15	≤7	≤17	≤2511	≤19
Age (yr) 60–69	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥100	≥18	≥33	≥25	≥33	≥3764	≥117
Very Good	91–99	11–17	25–32	16–24	29–32	3291–3763	78–116
Good	84–90	8–10	20–24	11–15	25–28	2843–3290	52–77
Fair	73–83	5–7	15–19	6–10	18–24	2383–2842	20–51
Needs Improvement	≤72	≤4	≤14	≤5	≤17	≤2382	≤19

FIGURE 7-19

HEALTHY MUSCULOSKELETAL FITNESS NORMS: FEMALES

Norms and Health Benefit Zones by Age Bands

Age (yr) 15–19	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥68	≥33	≥43	25	≥40	≥3167	169–180
Very Good	60–67	25–32	38–42	22–24	36–39	2795–3166	141–168
Good	53–59	18–24	34–37	17–21	32–35	2399–2794	122–140
Fair	48–52	12–17	29–33	12–16	28–31	2156–2398	91–121
Needs Improvement	≤47	≤11	≤28	≤11	≤27	≤2155	≤90
Age (yr) 20–29	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥70	≥30	≥41	25	≥38	≥3250	180
Very Good	63–69	21–29	37–40	18–24	34–37	2804–3249	136–179
Good	58–62	15–20	33–36	14–17	29–33	2478–2803	102–135
Fair	52–57	10–14	28–32	5–13	25–28	2271–2477	66–101
Needs Improvement	≤51	≤9	≤27	≤4	≤24	≤2270	≤65
Age (yr) 30–39	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥71	≥27	≥41	25	≥36	≥3193	180
Very Good	63–70	20–26	36–40	19–24	32–35	2550–3192	141–179
Good	58–62	13–19	32–35	10–18	28–31	2335–2549	112–140
Fair	51–57	8–12	27–31	6–9	24–27	2147–2334	61–111
Needs Improvement	≤50	≤7	≤26	≤5	≤23	≤2146	≤60
Age (yr) 40–49	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥69	≥24	≥38	25	≥31	≥2675	180
Very Good	61–68	15–23	34–37	19–24	27–30	2288–2674	115–179
Good	54–60	11–14	30–33	11–18	23–26	2101–2287	80–114
Fair	49–53	5–10	25–29	4–10	18–22	1688–2100	42–79
Needs Improvement	≤48	≤4	≤24	≤3	≤17	≤1687	≤41
Age (yr) 50–59	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥61	≥21	≥39	25	≥25	≥2559	110–180
Very Good	54–60	11–20	33–38	19–24	21–24	2161–2558	75–109
Good	49–53	7–10	30–32	10–18	16–20	1701–2160	47–74
Fair	45–48	2–6	25–29	6–9	10–15	1386–1700	15–46
Needs Improvement	≤44	≤1	≤24	≤5	≤9	≤1385	≤14
Age (yr) 60–69	Grip Strength (kg)	Push-Ups (#)	Sit and Reach (cm)	Partial Curl-Ups (#)	Vertical Jump (cm)	Leg Power (Watts)	Back Extension (sec)
Excellent	≥54	≥17	≥35	25	≥19	≥2475	91–180
Very Good	48–53	12–16	31–34	17–24	15–18	1718–2474	40–90
Good	45–47	5–11	27–30	8–16	11–14	1317–1717	19–39
Fair	41–44	2–4	23–26	3–7	7–10	1198–1316	6–18
Needs Improvement	≤40	≤1	≤22	≤2	≤6	≤1197	≤5

Used to Derive the Composite Back Fitness Score

MALES

Back Fitness Weighted Scores

Physical Activity Participation	Excellent 8	Very Good 6	Good 4	Fair 2	Needs Improvement 0
Waist Circumference	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Sit and Reach	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Partial Curl-Ups	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Back Extension	Excellent 8	Very Good 6	Good 4	Fair 2	Needs Improvement 0

FEMALES

Back Fitness Weighted Scores

Physical Activity Participation	Excellent 8	Very Good 6	Good 4	Fair 2	Needs Improvement 0
Waist Circumference	Excellent 8	Very Good 6	Good 4	Fair 2	Needs Improvement 0
Sit and Reach	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Partial Curl-Ups	Excellent 4	Very Good 3	Good 2	Fair 1	Needs Improvement 0
Back Extension	Excellent 8	Very Good 6	Good 4	Fair 2	Needs Improvement 0

FIGURE 7-25

COMPOSITE BACK FITNESS NOMOGRAM

Total Weighted Score Achieved

	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0				
Maximum Weighted Attainable Score	32	4	4	4	4	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0				
	28				4	4	4	4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0	0	0	0				
	24								4	4	4	4	3	3	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	0	0	0	0				
	20												4	4	4	3	3	3	3	3	3	2	2	2	2	2	1	1	1	1	1	0	0	0			
	16																4	4	4	3	3	3	3	3	2	2	2	1	1	1	1	0	0	0			
	12																					4	4	3	3	3	2	2	2	1	1	1	0	0	0		
	8																									4	4	3	3	2	1	1	0	0	0		
4																																	4	3	2	1	0

FIGURE 7-26

HEALTHY BACK FITNESS

Conversion Between Health Benefit Ratings and Scores

Health Benefit Rating	Symbol	Score
Excellent	E	4
Very Good	VG	3
Good	G	2
Fair	F	1
Needs Improvement	NI	0

FIGURE 7-27

HEALTH BENEFIT ZONES FOR BACK FITNESS

Health Benefit Zone

- Excellent ⤴ Your back fitness falls within a range that is generally associated with optimal back health.
- Very Good ⤴ Your back fitness falls within a range that is generally associated with minimal back health risk.
- Good ⤴ Your back fitness falls within a range that is generally associated with normal back health risk.
- Fair ⤴ Your back fitness falls within a range that is generally associated with moderate back health risk. *Continuing to progress from here into the GOOD zone will further reduce your back health risks.*
- Needs Improvement ⤴ Your back fitness falls within a range that is generally associated with considerable back health risks. *Try to follow positive lifestyle practices for improving back fitness. Progressing from here into the FAIR zone is a very significant step in reducing your back health risks.*

LEGER 20M SHUTTLE RUN SCALE

Males 12+

	very poor	poor	fair	average	good	very good	excellent
12-13 yrs	< 3/3	3/3-5/1	5/2-6/4	6/5-7/5	7/6-8/8	8/9-10/9	> 10/9
14-15 yrs	< 4/7	4/7-6/1	6/2-7/4	7/5-8/9	8/10-9/8	9/9-12/2	> 12/2
16-17 yrs	< 5/1	5/1-6/8	6/9-8/2	8/3-9/9	9/10-11/3	11/4-13/7	> 13/7
18-25 yrs	< 5/2	5/2-7/1	7/2-8/5	8/6-10/1	10/2-11/5	11/6-13/10	> 13/10
26-35 yrs	< 5/2	5/2-6/5	6/6-7/9	7/10-8/9	8/10-10/6	10/7-12/9	> 12/9
36-45 yrs	< 3/8	3/8-5/3	5/4-6/4	6/5-7/7	7/8-8/9	8/10-11/3	> 11/3
46-55 yrs	< 3/6	3/6-4/6	4/7-5/5	5/6-6/6	6/7-7/7	7/8-9/5	> 9/5
56-65 yrs	< 2/7	2/7-3/6	3/7-4/8	4/9-5/6	5/7-6/8	6/9-8/4	> 8/4
> 65 yrs	< 2/2	2/2-2/5	2/6-3/7	3/8-4/8	4/9-6/1	6/2-7/2	> 7/2

Females 12+

	very poor	poor	fair	average	good	very good	excellent
12-13 yrs	< 2/6	2/6-3/5	3/6- 5/1	5/2-6/1	6/2-7/4	7/5-9/3	> 9/3
14-15 yrs	< 3/3	3/3-5/2	5/3-6/4	6/5-7/5	7/6-8/7	8/8-10/7	> 10/7
16-17 yrs	< 4/2	4/2-5/6	5/7-7/1	7/2-8/4	8/5-9/7	9/8-11/10	> 11/10
18-25 yrs	< 4/5	4/5-5/7	5/8-7/2	7/3-8/6	8/7-10/1	10/2-12/7	> 12/7
26-35 yrs	< 3/8	3/8-5/2	5/3-6/5	6/6-7/7	7/8-9/4	9/5-11/5	> 11/5
36-45 yrs	< 2/7	2/7- 3/7	3/8- 5/3	5/4-6/2	6/3-7/4	7/5-9/5	> 9/5
46-55 yrs	< 2/5	2/5-3/5	3/6-4/4	4/5-5/3	5/4-6/2	6/3-8/1	> 8/1
56-65 yrs	< 2/2	2/2-2/6	2/7-3/5	3/6-4/4	4/5-5/6	5/7-7/2	> 7/2
> 65 yrs	< 1/5	1/5-2/1	2/2-2/6	2/7-3/4	3/5-4/3	4/4-5/7	> 5/7