

Name.....



Fitness Testing Results

Fitness Test	Fitness Component (include brief explanation)	Score	Standard (E,G,A,F,P)
Height			
Weight			
Arm Span			
Bend, Twist, Touch			
Stand Long Jump			
Vertical Jump			
Beep Test			
Illinois Agility Run			
30m Sprint			
12 min run			
Grip test			
Basketball throw			
Sit-ups (60 secs)			
Bouncing 2 basketballs			
Sit and reach			

Fitness Profile (draw your graph)

SECTION THREE: PHYSIOLOGICAL DIMENSIONS

Drug	Desired Effect	Harmful Side-Effects
Blood Doping	<ul style="list-style-type: none">• athlete is injected with 800-1200cc of blood shortly before competing (usually the athlete's own blood which has been donated several weeks before)• re-injection in blood increases the red cell count and therefore the oxygen carrying capacity of the blood• can increase performance by 2 to 5%	<ul style="list-style-type: none">• added volume of blood increases the thickness of blood making it more difficult to pump
Carbohydrate Loading	<ul style="list-style-type: none">• used to increase muscle glycogen levels and therefore endurance performance	<ul style="list-style-type: none">• increase in muscle glycogen causes an increase of water in the muscle which leads to a feeling of stiffness or heaviness

FITNESS TESTING

Physiological aspects, such as endurance, strength, flexibility and the other components of fitness, only account for a portion of any performance. Additional factors, including motivation level, extent of training, weather conditions and nutritional status also have a huge impact. Because many of these factors cannot be controlled, those involving physiological processes that can be measured, provide the performer and or coach with an important basis upon which to improve. Fitness testing attempts to measure individual components of performance, with the ultimate aim of studying and maximising the athlete's ability in each component.

Monitoring fitness levels or fitness testing is an important aspect of involvement in exercise or sport for the following reasons:

- The tests identify a person's strengths and weaknesses with regard to specific fitness components, so that a training program can be designed to cater for the individual.
- The test results are an effective means of providing feedback regarding initial fitness levels, improvements made as a result of training, and necessary modifications to the exercise program.
- The test results tend to provide incentives and motivation to train and continue in an exercise program.

There are numerous tests that can be used to assess an individual's capacity in each of the fitness components described earlier in this chapter. Some of

these must be conducted in a laboratory situation and require expensive and cumbersome equipment. Others are simple to administer, can be conducted in the 'field', and cost little to run. These 'field' tests are less accurate than the laboratory tests, but nevertheless can provide a valid indication of an individual's capacities.

When selecting fitness tests, there are a number of criteria that should be considered to ensure that the testing is appropriate, valid and accurate:

- A test should be selected because it measures a specific component of fitness that is of interest.
- The same procedures should be followed on each testing occasion, taking into account the order of tests, warm-up, recovery time between tests, and environmental conditions.
- The test chosen to assess each fitness component should be appropriate to the individual and within their capabilities. For example, you would not expect an elderly person to run for 12 minutes in order to monitor their cardiorespiratory endurance.

Table 9.5 provides a summary of the tests available to assess the various components of fitness.

A range of fitness tests will be considered in this chapter. In each case, the test will be addressed in relation to a specific component of fitness. Laboratory tests will not be covered, since they cannot be realistically undertaken in the school setting.

Each fitness test described is accompanied by **standards** or **norms**, which have been established from a large number of results obtained from persons aged 16 to 19 years. These standards enable the rating of personal scores to highlight the components of fitness which require improvement, and those which need to be maintained.

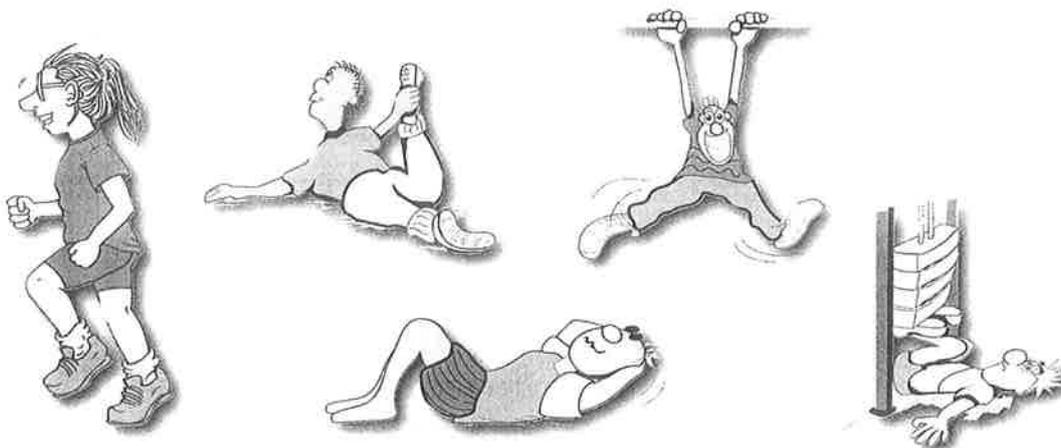


Table 9.5: Summary of Fitness Tests by Component

Fitness Component	Fitness Test	Laboratory/ Field Test
Cardiorespiratory Endurance	• VO ₂ maximum tests	Laboratory
	• Bicycle ergometer	Laboratory
	• Harvard step test	Field
	• Queen's College Step Test	Field *
	• 12-minute run	Field *
Muscular Endurance	• 1600 metre run	Field *
	• Sit-ups (abdominal)	Field *
Strength	• Flexed-arm hang (shoulders and arms)	Field *
	• Grip strength (grip dynamometer)	Field *
Flexibility	• One repetition max (maximum strength)	Field *
	• Sit and reach (static)	Field *
Body Composition	• Bend, twist and touch (dynamic)	Field *
	• Skinfold measures	Field *
Power	• Specific gravity method	Laboratory
	• Standing long jump	Field *
	• Standing vertical jump	Field *
	• Margaria stair running test	Field
Speed	• Repco peak power test	Laboratory
	• 40 metre sprint	Field
Agility	• 30 metre sprint	Field *
	• Illinois agility run	Field *
Reaction Time	• Ruler dropping test	Field *
	• Reaction board test	Laboratory
Coordination	• Bouncing 2 basketballs	Field *
	• Juggling	Field
Balance	• Balancing on a beam (static)	Field *

* Denotes fitness test described in the text.

Fitness Tests

A. Cardiorespiratory Endurance

1. Step test

Equipment:

40 cm high stepping bench, stopwatch, metronome.

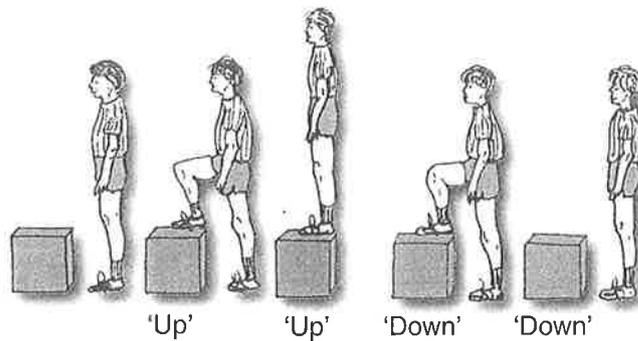


Figure 9.4: Step test

Procedure:

1. Establish a stepping rhythm with the assistance of a metronome. Females should step at 88 beats per minute and males at 96 beats per minute. The sequence is left up/right up/left down/right down (each part is 1 metronome beat).
2. Begin to step for 3 minutes at the set rhythm.
3. 5 seconds after the end of stepping take a pulse count for 30 seconds and multiply by 2 to determine heart rate in beats per minute. Compare this with the standards provided.

STANDARDS

in heart beats per minute.

(Adapted from Queen's College Step Test):

	Males	Females
Excellent	<120	<124
Good	120-130	124-134
Average	131-150	135-154
Fair	151-160	155-164
Poor	>160	>164

2. 12-minute run**Equipment:**

Stopwatch, measured course (establish a conversion from laps into distance).

Procedure:

1. Conduct a proper warm-up prior to commencing the run, and discuss breathing, intensity of the run and recovery strategy.
2. Record the distance covered in 12 minutes.
3. Compare the distance run (in kilometres) with the standards provided.

STANDARDS

in completed kilometres:

	Males	Females
Excellent	>2.99	>2.29
Good	2.70-2.99	2.10-2.29
Average	2.50-2.69	1.80-2.09
Fair	2.30-2.49	1.50-1.79
Poor	<2.30	<1.50

3. 1600 metre run**Equipment:**

Stopwatch, measured course.

Procedure:

1. Conduct a proper warm-up prior to commencing the run, and discuss breathing, intensity of the run and recovery strategy.
2. Complete the 1600 m run and record the time taken.
3. Compare the recorded time with the standards provided.



STANDARDS

in minutes and seconds:

	Males	Females
Excellent	<6.22	<8.33
Good	6.22-6.53	8.33-10.06
Average	6.54-7.27	10.07-11.35
Fair	7.28-8.41	11.36-14.05
Poor	>8.41	>14.05

B. Muscular Endurance**1. Sit-ups (endurance of abdominal muscles)****Equipment:**

Firm cushioned surface, stopwatch.

Procedure:

1. Lie on back with the knees flexed at right angles.
2. Hands should either be interlocked behind the head or with finger on temples and elbows pointing out from the body.
3. A full sit-up is counted when the back is curled and the trunk is raised until the lower back is at least perpendicular to the floor, and then returned to the starting position.
4. Count the number of sit-ups completed in 1 minute.
5. Compare the number of sit-ups counted with the standards provided.



✗ no hands behind head.
 ✓ Arms crossed over chest.

Figure 9.5: Sit-ups test

STANDARDS

in number of sit-ups:

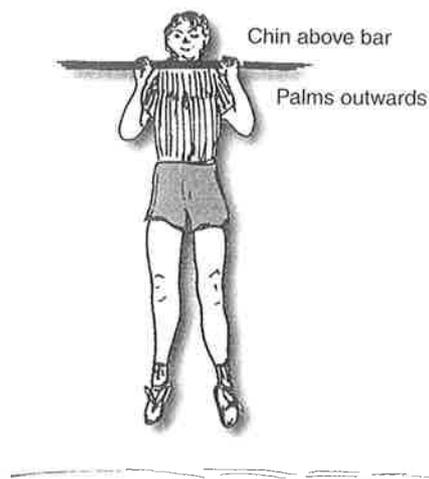
	Males	Females
Excellent	>60	>50
Good	51-60	41-50
Average	40-50	30-40
Fair	34-39	22-29
Poor	<34	<22

2. Flexed-arm hang (arm and shoulder muscular endurance)**Equipment:**

High bar or chin-up bar, stopwatch, chair.

Procedure:

1. Standing on a chair, reach up to grip the overhead bar with palms facing outwards.
2. Jump and pull up so that the chin is above the bar (but not touching it), arms are flexed with elbows in close to the body, and legs are hanging straight down.
3. Hold this position for as long as possible. Timing begins when the correct position has been attained, and stops when the chin either touches or moves below the level of the bar.
4. Compare the time recorded with the standards provided.

**Figure 9.6: Flexed-arm hang test**

STANDARDS

in seconds:

	Males	Females
Excellent	>69	>39
Good	60-69	27-39
Average	51-59	17-26
Fair	40-50	9-16
Poor	<40	<9

C. Strength**1. Grip strength (fingers, hand and forearm)****Equipment:**

Hand grip dynamometer

Procedure:

1. Adjust the grip dynamometer so that it fits the dominant hand comfortably.
2. Squeeze the dynamometer as hard as possible (a downward thrust is permitted).
3. Repeat the test 3 times and record the best score as read from the dial (in kilograms).
4. Compare the best score with the standards provided.

**Figure 9.7: Grip strength test**

STANDARDS

in kilograms:

	Males	Females
Excellent	>60	>37
Good	54-60	31-37
Average	47-53	24-30
Fair	40-46	17-23
Poor	<40	<17

2. One repetition max (maximum strength)

Equipment:

Free weights or machine to complete a bench press and/or leg press

Procedure:

1. Warm up thoroughly with light aerobic exercise and 10 mins of stretching to all major muscle groups.
2. Chose a weight that you think is about 80% of your 1-RM (repetition max).
3. Perform the exercise – the bench press or leg press with perfect form for one repetition only.
4. Rest for at least 5 mins.
5. Add as small a weight increment as possible and try again. Remember to have your spotter with you.
6. Keep resting and repeating until you find a weight that you cannot quite manage on your own. The weight before that is your 1-RM.
7. Take your 1-RM weight for the bench press and leg press and divide it by your body weight. For example, if you bench pressed 35 kgs and you weigh 65 kgs, your score is 0.5.
8. Compare your score with the standards provided.

STANDARDS

	Males		Females	
	Bench Press	Leg Press	Bench Press	Leg Press
Excellent	1.4	2.8	0.7	2.2
Very good	1.2	2.4	0.6	2.0
Good	1.0	2.0	0.5	1.8
Fair	0.8	1.8	0.4	1.4
Poor	0.6	1.4	0.3	1.2

D. Flexibility**1. Sit and reach (static flexibility of the trunk, lower back and hamstrings)****Equipment:**

Sit and reach bench, or gymnastics bench and metre ruler.

Procedure:

1. Ensure that a total body warm-up is conducted prior to beginning this test.
2. Sit on the floor with feet on either side of the ruler and pressed against the flat surface of the bench.
3. Keeping the knees straight and bending at the trunk, stretch as far forward as possible with both arms extended along the ruler.
4. The stretch must be held for 3 seconds. Record the best of 3 attempts.
5. Compare the best score obtained with the standards provided.

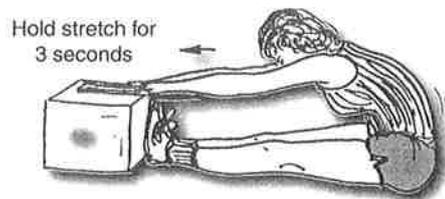


Figure 9.8: Sit and reach test

STANDARDS

in centimetres:

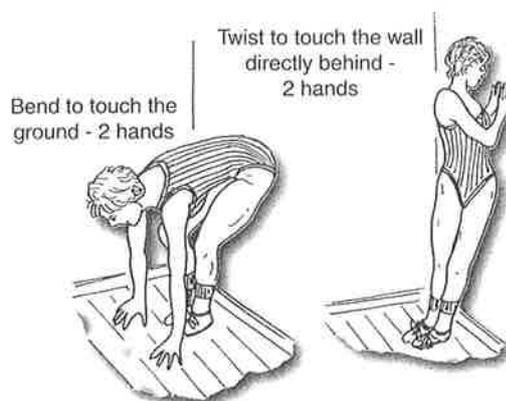
	Males	Females
Excellent	>13	>17
Good	9-13	13-17
Average	5-8	9-12
Fair	0-4	5-8
Poor	<0	<5

2. Bend, twist and touch test (dynamic flexibility)**Equipment:**

Wall, stopwatch.

Procedure:

1. Stand 0.5 metres from a wall with feet apart and back to the wall.
2. From a standing position, bend to touch the floor directly in front of the body with both hands.
3. Return to the standing position, turning to the right to touch the wall directly behind with both hands.
4. Bend to touch the floor again, then stand to touch the wall directly behind, this time turning to the left.
5. Repeat this as many times as possible in 20 seconds. Count 'one' each time the wall is touched.
6. Compare score with the standards provided.

**Figure 9.9: Bend, twist and touch test**

STANDARDS

in number completed:

(NOTE: the same standards apply for males and females.)

Excellent	>19
Good	18
Average	17
Fair	15-16
Poor	<15

E. Body Composition**1. Skinfold measurements****Equipment:**

Skinfold callipers

Procedure:

1. Skinfolds will be measured at 3 specific sites on the body - the triceps, scapula and abdomen.
2. Measure skinfolds on the right hand side of the body using skinfold calipers. These calipers are designed to measure the thickness of the skin and subcutaneous fat (fat stored beneath the skin).
3. Grasp the skinfold between the thumb and forefinger. The skinfold should contain two skin surfaces and the subcutaneous fat, but not muscle.
4. Apply the calipers about 1 cm below the fingers holding the skinfold, as deep as possible on the skinfold. Take each fold in the vertical plane while the subject is standing.
5. Repeat the procedure 3 times at one site before progressing to the next, in order to ensure accuracy. The mean of the 2 closest readings should be recorded.
6. The sites at which the measurements should be taken are:
 - **Triceps** – the back of the upper arm, midway between the shoulder and the elbow.
 - **Subscapular** – the bottom point of the scapula (shoulder blade).
 - **Abdomen** – 5 centimetres to the side of the navel.
7. Add the 3 measurements obtained for a total skinfold.
8. Compare the score obtained with the standards provided.

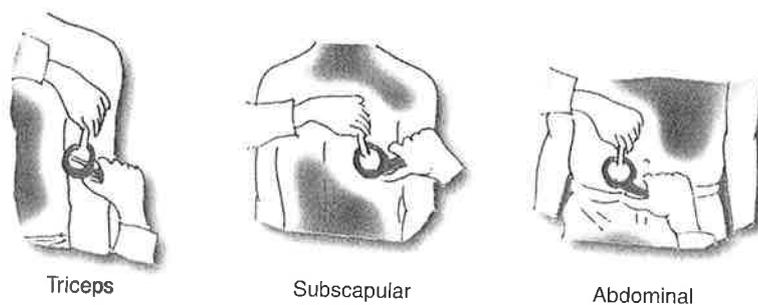


Figure 9.10: Sites for skinfold measurements

STANDARDS

for total of 3 skinfold measurements:

	Males	Females
Excellent	<22	<25
Good	34-22	42-25
Average	65-35	73-43
Fair	82-66	90-74
Poor	>82	>90

F. Power

1. Standing long jump (leg power)

Equipment:

Measuring tape, firm non-slip surface, take-off line.

Procedure:

1. With toes behind the take-off line and feet still, jump forward to cover as much distance as possible. No run-up is allowed.
2. Land on both feet and continue momentum forward. Distance is measured from the take-off line to the heels, or part of body closest to the take-off line.
3. Measure 3 jumps and record the greatest distance covered.
4. Compare the best score with the standards provided.

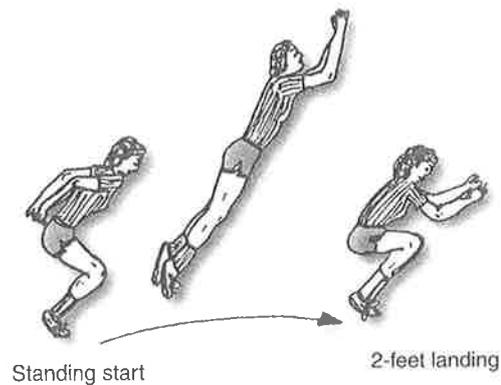


Figure 9.11: Standing broad jump

STANDARDS

in centimetres:

	Males	Females
Excellent	>228	>190
Good	217-228	177-190
Average	207-216	166-176
Fair	196-206	153-165
Poor	<196	<153

2. Vertical jump (leg power)

Equipment:

Vertical jump board or markings on a wall.

Procedure:

1. Face the jumping board or marked wall with feet flat on the floor and both arms fully extended overhead. Record the height at which the tips of the middle fingers touch the board/wall.
2. Turn to stand side-on to the board/wall. From a standing position, flex the knees and then jump as high as possible, touching the board/wall with the finger tips of one extended hand at the maximum height.
3. Have 3 attempts. Record the greatest distance obtained between the height of the standing reach and the height of the jump. This is the greatest height jumped.
4. Compare the height jumped with the standards provided.

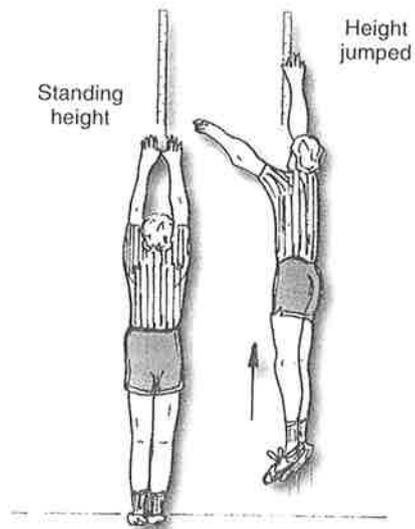


Figure 9.12: Vertical jump test

STANDARDS

in centimetres:

	Males	Females
Excellent	>65	>58
Good	55-65	47-58
Average	45-54	36-46
Fair	35-44	26-35
Poor	<35	<26

G. Speed**1. 30 metre sprint****Equipment:**

Stopwatch, measured 30 metre running surface.

Procedure:

1. Using a 'flying start', sprint the 30 metre distance.
2. The stopwatch should be started as the runner crosses the start line and stopped as the runner crosses the finish line.

- Record the best of 3 attempts, and compare the time with the standards provided.

STANDARDS

in seconds:

	Males	Females
Excellent	<4.0	<4.5
Good	4.2-4.0	4.6-4.5
Average	4.4-4.3	4.8-4.7
Fair	4.6-4.5	5.0-4.9
Poor	>4.6	>5.0

H. Agility

1. Agility run

Equipment:

Stopwatch, non-slip surface, tape measure, 4 markers.

Procedure:

- Start lying face down behind the starting line, head to the line, elbows flexed and hands by the shoulders.
- On the command 'GO', jump to your feet and run the course as fast as possible.
- The stopwatch is started on the command 'GO' and stopped as the finish line is crossed.
- Compare the time taken with the standards provided.

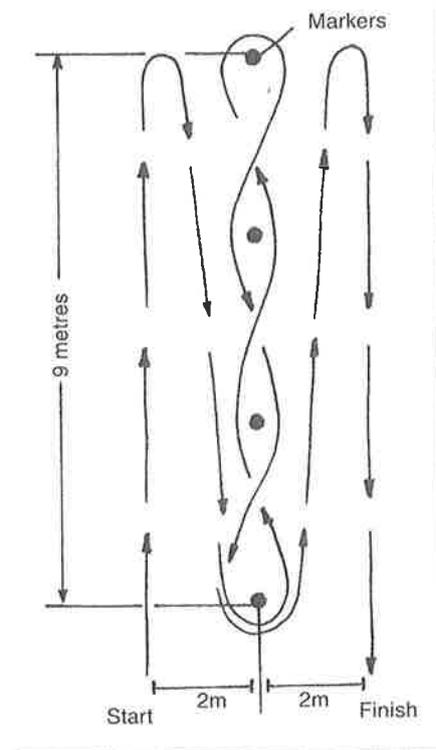


Figure 9.13: Agility run

STANDARDS

in seconds:

(Adapted from Illinois Agility Run):

	Males	Females
Excellent	<15.2	<17.0
Good	16.1-15.2	17.9-17.0
Average	18.1-16.2	21.7-18.0
Fair	19.0-18.2	23.0-21.8
Poor	>19.0	>23.0

I. Reaction Time**1. Dropping the ruler test****Equipment:**

Metre ruler.

Procedure:

1. Place a metre ruler, held by a partner at the '0' end, against the wall.
2. Place the preferred hand level with the 50 cm mark on the ruler, without touching the ruler.
3. Without warning, partner lets go of the ruler which must be caught with the thumb and index finger.
4. Score is the number marked on the ruler just above the index finger.
5. Record the best of 3 attempts, and compare the score with the standards provided.

STANDARDS

in centimetres covered:

(NOTE: the same standards apply for both males and females.)

Excellent	>42.5
Good	37.1-42.5
Average	29.6-37.0
Fair	22.0-29.5
Poor	<22.0

J. Coordination

Bouncing 2 basketballs

Equipment:

2 basketballs, stopwatch, hard surface.

Procedure:

1. Beginning with 1 basketball in each hand, bounce them alternately for as long as possible without losing control.
2. Record the best of 3 attempts and compare the time with the standards provided.

STANDARDS

in seconds:

(NOTE: the same standards apply for both males and females.)

Excellent	>60
Good	40-60
Average	20-39
Fair	10-19
Poor	<10

K. Balance

1. 'Stork' stand on a beam

Equipment:

Balance beam, stopwatch.

Procedure:

1. Stand on a balance beam on 1 leg with the eyes closed for as long as possible.
2. Timing should begin on the command 'GO' and stop when balance is lost, or the eyes are opened.
3. Record the best of 3 attempts and compare the time with the standards provided.

3. Interpreting the Results

The first step in the interpretation of test results requires you to determine how important each of the components that were tested are to the overall purpose of the fitness testing schedule. For example, if testing a group of basketballers for sports specific fitness, while a poor result in a body fat test may be of concern, it is not as vital as a poor result in an endurance test.

If the results are being compared to norms or standards, you must consider if the norms used the same test procedures, and the subject population and age group are similar.

If the test results are being compared over time, are the changes seen from test to test significant? There is normal variation in results from test to test due to factors such as biological variation, tester error, equipment calibrations, and conditions, so you must decide if the differences recorded are significant to affect performance, and are greater than can be expected from general sources of error.

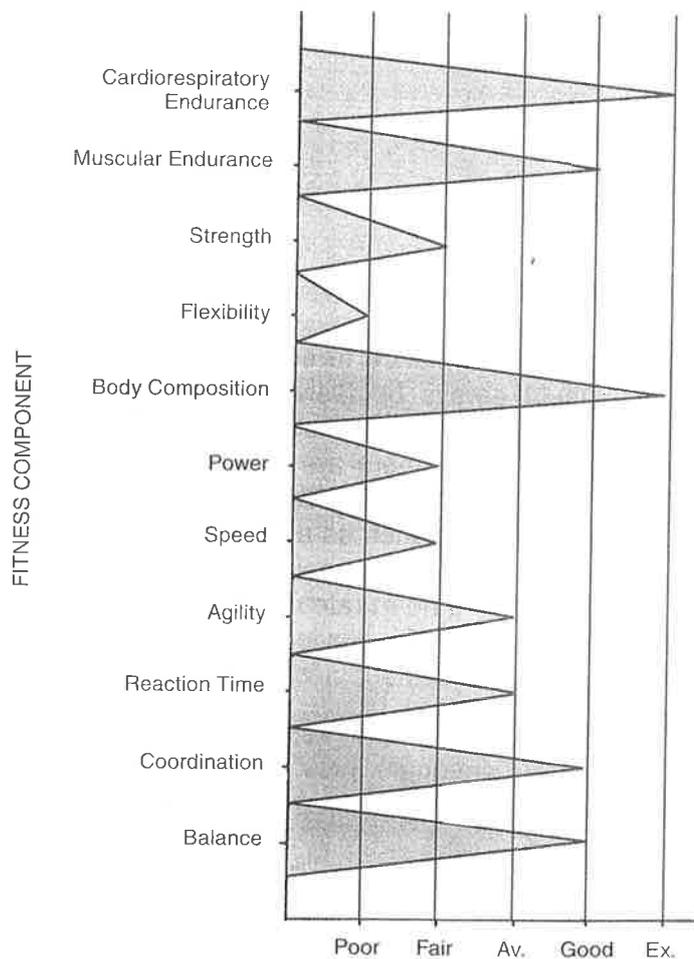


Figure 9.14: Example of a fitness profile

Draw sideways in space provided.