

Fitness measurement and evaluation

Fitness measurement and evaluation help in determining an individual's level of physical fitness. Fitness tests determine an individual's baseline fitness level and are often the starting point for a trainer to design an appropriate exercise program. The specific tests the trainer uses in the assessment are dependent on the person's health and fitness goals, their experience and the types of workout routine the person is doing.

Purpose of physical-fitness measurement

The reasons for measuring physical fitness include:

- To provide a starting point when designing training programs. This is important so the coach can ensure overload is placed on the athlete during training, but making sure the training is not too hard.
- To identify strengths and weaknesses in fitness. An athlete may have good endurance, flexibility and cardiovascular endurance, but below average strength. By identifying these strengths and weaknesses, an athlete can prioritise training.
- To monitor progress and effectiveness of training. Although it is interesting to compare individuals' results against norms tables, it is much more important to look at individual performances and progress. Retesting will provide valuable information regarding the effectiveness of the training, as well as indicating personal improvement.
- To motivate or encourage the athlete. If an athlete can see improvements in their fitness levels they are likely to continue training and performing at optimal levels.
- **To provide data** that enables athletes returning from injury to compare current fitness levels with pre-injury fitness levels.
- To assist in talent identification programs by searching for athletes whose fitness test profiles match the typical profiles of elite athletes in that sport.

Positive and negative effects of measurement

Measurement and evaluation of physical fitness provides both positive and negative outcomes. These will vary from individual to individual.

The positive outcomes include:

- Individuals that achieve good test results usually enjoy the experience.
- Results may increase motivation.
- Allows individuals to chart improvements.
- Allows comparisons to be made when returning from injury.
- Provides vital information regarding specific fitness needs.

The negatives outcomes include:

- Individuals that achieve poor results usually don't enjoy the experience.
- Individuals may find their results decrease motivation.
- Individuals who lack confidence and/or ability may find testing stressful and unpleasant.
- Body composition tests are unpopular with many adolescents and adults.
- It is difficult to monitor many types of improvement through testing.
- Sometimes individuals do not perform well in tests.

ICT task 🔳

 In pairs, use a website such as SurveyMonkey (<u>www.surveymonkey.com</u>) to create a survey for the rest of the class to participate in, to determine the positive and negative outcomes for young people of fitness testing. Draft your questions (minimum of 10) for the survey in the space below.

Example question: What are the positive outcomes of fitness testing?

Process and interpret the results of the survey and present the results as a bar graph in the space below.



Using fitness measurement results

Coaches and their support staff have athletes undergo fitness testing during various parts of the season for a number of reasons:

- provide information on the different components of fitness
- tailor an individual fitness program for the athlete
- evaluate fitness levels during injury rehabilitation
- develop personal fitness programs for injured athletes
- provide an indication when the athlete is able to return to play
- provide information for team selection protocols.

When an athlete is rehabilitating from an injury, support staff may further compare pre-season fitness results with current measurements of the athlete. This allows support staff to assess components such as athlete pain-free range of motion, strength, power and/or flexibility, from pre-season to progression through rehabilitation. Such comparison of results will determine readiness of the athlete to resume competition.

In team selections, fitness measurements and evaluations are used across a variety of sports and will be specific to sporting context and role required. Testing may include aerobic-endurance tests such as the yo-yo test, agility test, the vertical jump measuring leg power, skin-fold tests, lower back and hamstring flexibility, reaction time tests, sport-specific skill-related tests, and many other tests addressing key health- and skill-related components of physical fitness. This information gives clubs vital data on prospective players so that clubs can make informed decisions on the suitability of future players within their team.

Activity

Select a sport to research that you participate in or enjoy watching.

1. Describe some common sport-specific injuries of athletes in the sport.

2. Examine why these injuries may occur.

3. Outline how fitness measurement and evaluation can assist an athlete through injury rehabilitation or prevention of these possible sport-specific injuries.

ICT task 🗐

- Watch the following YouTube video to learn about the rules of Australian football: <u>https://youtu.be/XMZYZcoAcU0</u>.
- a. Propose what you believe are some significant aspects of the game.

b. Outline how these could be tested via fitness measurement and evaluations.

 Watch the following YouTube video to learn about the AFL draft's testing procedures: <u>https://youtu.be/TLYW2bDT4Tc</u> (note: some tests have changed since the video was made, such as the beep test being replaced by the yo-yo test). Research, identify and describe one of the tests used in the AFL draft combine for the each of the following categories.

Category	Test	Description of test
Fitness		
6		
Physical		
Psychomotor		
Psychological		
Medical		

- 3. Think of another sport that you participate in or enjoy.
- a. Determine some key aspects of that sport.

b. Predict what team selectors would be looking for in athletes of this sport.

c. Propose how and what fitness measurements could test these aspects.

Measuring physical fitness levels

For a test to be reliable and valid, it is important for the person who is conducting the test to strictly follow the procedure. If any variation from the agreed protocol occurs, the test results could vary greatly for the person the next time he or she is tested. If the tests are not conducted properly and in the same environment, they may be unreliable and meaningless.

Practical activity

Participate in the following fitness tests and use the rating tables to interpret your performance and identify your strengths and the weaknesses.

Multi-stage fitness test (cardiovascular endurance)

- Measure a 20 metre distance and mark with tape or markers at each end.
- Check tape, CD and player.
- Start the cadence tape
- Instruct the student/s (can be done in groups) to run to the opposite end and place one foot beyond the line by the time the next beep sounds on the tape. If they arrive before the beep they should pivot and wait for the signal, then run to the back to the opposite line to reach this line before the next beep.
- At the end of each minute the time interval between each beep is decreased, thereby running speed becomes progressively faster.
- Ensure that each student reaches the end line each time and does not turn short.
 Emphasise to the student to pivot and turn, rather than make an arc which tends to take more time.
- Each student continues running for as long as possible until he/she can no longer keep up with the beeps on the tape. The criterion for eliminating a student is two lengths in row where they are more than two steps from the end once the beep sounds.
- Record the last level and shuttle the student successfully completed.

Multi-stage fitness test ratings

Rating	Female	Male
Poor	< 3	< 4
Fair	3–4	4–5
Average	5–6	6–7
Good	7–8	8–9
Excellent	> 8	> 9







1.6km run (cardiovascular endurance)

- Measure out either 1.6 km or four laps of a standard running 400 m track.
- The student starts in a standing position and attempts to complete the distance in the shortest possible time.
- The timer should remind the student how many laps they have to go and also have the option to ring a bell in a final lap.
- Emphasise that the student is to not attempt to sprint the entire race as this is not possible.
- Record the final time in both minutes and seconds.
- Check all medical conditions such as asthma and take necessary precautions.
- Water should be made available to student after and during run if desired.

1.6km run ratings

Rating	Female	Male
Poor	> 9:51	> 7:20
Average	8:15–9:51	6:20–7:20
Excellent	< 8:15	< 6:20

Time: __

Sit and reach test (flexibility)

- The student sits bare-footed on the floor with both legs straight out in front of them positioned against the sit and reach box.
- The fingers of the student are straight and palms facing down.
- They then flex forward at the hip and place the fingers along the ruler which is positioned onto top of the box.
- They push out along the ruler and hold for three seconds. If students cannot reach past their toes, a negative reading is recorded in centimetres.
- The measure is read from the nearest centimetre. Results beyond the toes are positive and those that do not reach beyond the toes are negative.
- Two warm–up attempts are allowed, followed by two measuring trials.
- Ensure students perform a warm-up prior to testing.

Sit and reach test ratings

Rating	Female	Male
Poor	< -1 cm	< -2 cm
Average	-1–5 cm	-2–2 cm
Good	6–9 cm	3–7 cm
Excellent	> 9 cm	> 7 cm
Good Excellent	6–9 cm > 9 cm	3–7 cm > 7 cm

Distance: ____

Groin flexibility test

- Sit on the floor with both legs on the floor, legs together. The soles of the feet should be together and facing each other. This should form the shape of a diamond.
- Grab hold of the ankles with both hands, and pull them as close to the body as possible. Measure the distance from your heels to your groin.

Groin flexibility test ratings

Rating	Measurement	
Poor	> 20 cm	
Fair	15–20 cm	
Average	10–15 cm	
Good	5–10 cm	
Excellent	< 5 cm	

Distance:

Hand-grip test (muscular strength)

- Ensure that the needle of the dynamometer is set to zero.
- Hold the dynamometer in the dominant hand, vertically above your shoulder.
- The student then squeezes the dynamometer while slowly lowering the arm in front of their body to finish at the side of their leg.
- Record the value in (kilograms) as displayed on the dial. A second effort or final squeeze is not permitted after arm has been lowered.
- Repeat and record the maximum value.

Hand-grip test ratings

Rating	Female	Male
Poor	< 16 kg	< 26 kg
Average	16–27 kg	26–40 kg
Good	29–34 kg	41–49 kg
Excellent	> 34 kg	> 49 kg

Value: _

1RM leg press (muscular strength)

- The student should perform an adequate warm-up. An example would be to warm up with 5–10 reps of a light-to-moderate weight, then after a minute rest perform two heavier warm-up sets of 2–5 reps, with a two-minute rest between sets.
- The student should then rest two to four minutes, then perform the one-rep-max leg press attempt with proper technique. If the lift is successful, rest for another two to four minutes and increase the load 5–10 per cent, and attempt another lift. If the subject fails to perform the lift with correct technique, rest two to four minutes and attempt a weight 2.5–5 per cent lower. Keep increasing and decreasing the weight until a maximum left is performed. Selection of the starting weight is crucial so that the maximum lift is completed within approximately five attempts after the warm-up sets.

1RM leg press ratings

Rating	Percentage of body weight
Poor	< 65 %
Average	65–110 %
Excellent	> 110 %
Attempt 1:	
Attempt 3:	
Attempt 4:	
Attempt 5:	



Maximum push-up (muscular endurance)

- Lie on gym mat, hands shoulder width apart, bent knee position (for modified push-ups) or completely flat on the gym mat (full push-ups) and fully extend the arms.
- Lower the upper body until the elbows reach 90°.
- Return to the starting position with the arms fully extended.
- The push-up action is to be continuous with no rest.
- Complete as many modified or full push-ups as possible.

Maximum push-up test ratings

Rating	Count
Poor	0–5
Fair	6–16
Average	17–33
Good	34–40
Excellent	41 +

Tally: ___

Plank hold (muscular endurance)

- Hold the body in an elevated position for as long as possible.
- The upper body should be held off the ground through support by the elbows and forearms.
- The rest of the body should be in the push-up position.
- Hold this position for as long as possible. The test is over when the back is no longer straight or the hips touch the ground.

Plank hold ratings

Rating	Time
Poor	< 0.5 min
Fair	0.5–1.5 min
Average	1.5–2 min
Good	2–3 min
Excellent	> 3 min
Time:	