

The components of fitness



UNTAM ED
EDUCATION

2.3 Health, fitness and training

Health-related Fitness Components

Power

Flexibility

Strength

Muscular endurance

Cardio-vascular endurance

The components of fitness

Skill-related Fitness Components

Speed

Agility

Co-ordination

Reaction Time

Balance

Timing



The components of fitness

Definition of Fitness

“Fitness is the ability to meet the demands of the environment.”

Everything that you experience and surrounds you is your environment. Home, school, commuting, sports, hobbies, meeting friends, shopping and housework.

You will study **2 different types** of fitness components;

1. Health-related Fitness

2. Skill-related Fitness

Health-Related Fitness

1. Cardio-Vascular Endurance (Aerobic Fitness)

“The ability to perform for a long period of time”

Explanation

- a. Cardio-vascular refers to the **heart** and the **circulatory system** (blood vessels)
- b. This is determined by the body's ability to **take in oxygen** and **deliver** it to the **working muscles** efficiently.
- c. Good cardio-vascular endurance is needed for: Marathon running, Swimming (long distance), Cycling (long distance).

► Measurement 1 - Multi-Stage Fitness Test

- 1. Set up cones 20m apart.
- 2. Participants line up at one end of the course.
- 3. On the beep participants run to the other end.
- 4. On the next beep they run back.
- 5. This is repeated until each participant fatigues and stops.
- 6. The level and shuttle is recorded for each participant.





The components of fitness

Measurement 2 - 12 Minute Cooper Run

1. Run and try to cover as much distance as possible in 12 minutes.
2. Count each completed lap and multiply this by the lap distance.
3. Walking is allowed but try and push yourself.

Gender	Male	Female
Poor	<2200	<1600
Below Average	2200-2299	1600-1699
Average	2300-2499	1700-1999
Above Average	2500-2800	2000-2100
Excellent	>2800	>2100

2. Muscular Endurance

“The ability for muscles to repeat contractions without tiring”

Explanation

- a. Being able to continue the **muscle contracting** over **prolonged periods of time** can result in a build up of lactic acid and energy stores depleting.
- b. The fitter the person the longer they can **offset lactic acid build up**.
- c. Good muscular endurance is needed for: **Rowing, Swimming and Cycling** (long distance).

Measurement

► Multi-Stage Abdominal Curl Conditioning Test

1. Lie on the mat with your knees bent at right angles and your feet flat on the ground.
2. Rest your hands on your thighs.
3. Raise your upper body until your hands touch your knees.
4. Return to start position.
5. Count the number of complete press-ups in one minute.

Gender	Male	Female
Poor	<17	<9
Below Average	17-19	9-14
Average	20-25	15-20
Above Average	26-30	21-25
Excellent	>30	>25



The components of fitness

3. Muscular Strength

“The ability to bear weight.”

Explanation

Dynamic Strength

- a. This is the strength an athlete can apply over a **prolonged period of time**.
- b. Footballers and long distance runners need this kind of strength to complete **repeated contractions** over a long period of time.

Static Strength

- a. This is the greatest amount of strength that can be applied to an **immovable** object.
- b. Rugby players need to apply this strength in a rugby scrum.

Explosive Strength

- a. This is the maximum amount of strength that can be generated in **one fast burst** of movement.
- b. Athletic **throwing** and **jumping** athletes need to have this kind of strength to record a large distance.

Maximal strength

- a. The **greatest force** possible in a single contraction.

Measurement

► Hand Grip Strength Test

1. Adjust the hand grip dynamometer to suit your hand.
2. Hang the dynamometer in line with your arm with your dominant hand.
3. The maximum strength is applied to
4. the meter without the arm moving.
5. Take the best score of two attempts.

Gender	Male	Female
Poor	<30	<26
Below Average	30-39	26-35
Average	40-49	36-46
Above Average	50-65	47-58
Excellent	>65	>58



The components of fitness

► One rep max test

- Choose a realistic achievable weight.
- Using the correct technique lift the bar once.
- Rest.
- If you feel you can, increase the weight and lift again.
- Repeat until you reach one rep max.
- Record the kilogram weight.



4. Flexibility

“The range of movement at a joint”

Explanation

- Reduces the risk of muscle and tendon **injury**.
- Good flexibility is needed for:
 - **Gymnastics - Splits**
 - **Dance - Split leap**
 - **Football – Slide tackle**



Measurement

► Sit and Reach Test

- Sit with your feet flat against a bench or a sit and reach block.
- Then lean as far forward as
- you can without bending your knees.
- A measurement is taken from the fingertips with the soles of the feet being 0cm.

Gender	Male	Female
Poor	<4	<4
Below Average	4-7	4-7
Average	8-11	8-12
Above Average	12-14	13-15
Excellent	>14	>15

The components of fitness

5. Power/Explosive Strength

“An individual’s ability to generate force rapidly”

Explanation

- a. This is the body’s ability to do **strength** performances rapidly.
- b. **Power = Speed x Strength.**
- c. Strength and power are needed for: **high jumping, shot putting, weight lifting.**

► Measurement - Vertical Jump Test

1. Stand sideways to the wall and with your feet flat on the wall, reach up as high as you can with your arm closest to the wall.
2. Make a note of this height from the floor to your fingertips.
3. Move away from the wall slightly.
4. Bend and jump as high as you can and at the highest point touch the wall with a piece of chalk.
5. Measure this distance.
6. Minus the distance from standing to the distance when jumping.

Gender	Male (cm)	Female (cm)
Poor	<30	<26
Below Average	30-39	26-35
Average	40-49	36-46
Above Average	50-65	47-58
Excellent	>65	>58

6. Speed

“The ability to move a body part quickly”

Explanation

- a. This is how quickly a person can cover a **distance** or how quickly they can perform a single movement.
- b. Speed is needed for:
 - A **fast bowl** in Cricket or Baseball
 - Throwing a **javelin**

100m sprint





The components of fitness

Measurement

► 30m Sprint Test

1. From a standing start run as fast as you can down the marked 30m lane.
2. The time is stopped when you run through the finish line.

Gender	Male (s)	Female (s)
Poor	>4.6	>5
Below Average	4.6-4.5	5-4.9
Average	4.4-4.3	4.8-4.7
Above Average	4.2-4	4.6-4.5
Excellent	<4.0	<4.5

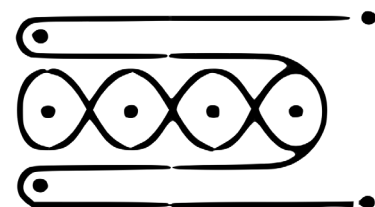
Skill-Related Fitness Tests

1. Agility

“The ability to change direction quickly.”

Explanation

- a. Being able to **change the position** of the body **quickly** without losing control is important in many sports and skills such as:
- Dribbling in Football - to take it around a player.
 - Faking a run in Basketball



Measurement

► Illinois Agility Run

1. Start by lying down on the floor at the start.
2. On “go”, push to your feet and run around the course in the pattern above.
3. Time is recorded when you pass the finish.

Gender	Male	Female
Poor	>18.8s	>23.4
Below Average	17.7-18.8s	22.5-23.4
Average	16.8-17.6s	18.7-22.4
Above Average	15.9-16.7s	17.5-18.6
Excellent	<15.9	<17.5

2. Balance

“The ability to hold a position without falling.”

Explanation

- a. The bigger your **base of support** the more **balanced** you are.
- b. Holding your **centre of mass directly over the base of support** increases balance.



The components of fitness

- ▶ Handstand in Gymnastics
- ▶ Marks position in 100m sprint

Measurement

▶ Standing Stork Test



1. Standing place your hands on your hips.
2. Lift one leg and place the toes of that foot on the knee of the standing leg.
3. On go lift your heel of the floor and stand on your toes. The times starts.
4. The times stops when the heel touches the floor, the foot moves away from the knee, or the standing foot moves position.

Gender	Teenager
Poor	<11s
Below Average	11-25s
Average	26-39s
Above Average	40-49s
Excellent	>50s

3. Co-ordination

“The ability to move the body parts smoothly and accurately in response to your senses”

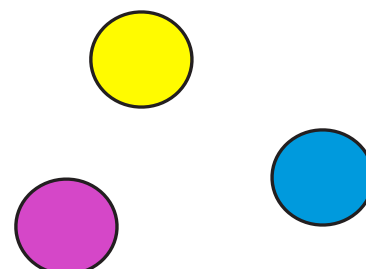
Explanation

- a. Being able to intentionally **move more than one body part at the same time** accurately.
- b. Co-ordination is needed for most sports but in particular:
 - ▶ Dance movements
 - ▶ Tennis serve

Measurement

▶ Anderson wall toss coordination test

1. Hold two balls in your dominant hand and one in the other.
2. Throw one ball from your dominant hand to the other.
3. At its highest point throw the ball from your weaker hand to the dominant hand.
4. Throw the remaining ball in your dominant hand to the weaker hand.





The components of fitness

5. Repeat the action for as long as you can.
6. Compare the number of rotations you can do compared to your classmates.

4. Speed of Reaction

“The speed of reaction to a stimulus”

Explanation

- a. This is how fast you can **initiate** a **movement** after you are **presented** with a **stimulus**.

- ▶ **Sprinting from the blocks** when you hear the gun.
- ▶ A goalkeeper reacting to a **deflected shot**.



Measurement

▶ Ruler Drop Test

1. The person assisting you holds the ruler up high and with their arm outstretched.
2. The ruler's 0 mark should be level with the finger and thumb of your slightly open hand.
3. The ruler is released without warning and you must try and catch it between your thumb and finger as quick as possible.
4. The distance you catch it is recorded.

Gender	Teenagers
Poor	>28cm
Below Average	20 cm - 28cm
Average	15 cm - 20 cm
Above Average	7.5 cm - 15 cm
Excellent	<7.5 cm

5. Timing

“The ability to act at just the right time.”

Explanation

- a. Being able to move at the **correct moment** in time during skill performance can determine the outcome of a performance.
- b. **Striking the ball** at the right moment when performing a volley in Football.
- c. Timing when to initiate a tackle in Rugby or American football.





The components of fitness

Measurement

- ▶ There is **no formal test** that is used to measure timing as this is skill specific and should be tested when performing the skill.

Reasons to Test

- ▶ Identify **strengths** or **weaknesses** in a performance or training programme.
- ▶ Monitors **improvement**.
- ▶ Gives a **base line** level of fitness.
- ▶ Allows individual scores to be compared to group norms or **national averages**.
- ▶ Allows **goals** to be set and **motivates**.
- ▶ Informs the training programme.
- ▶ Determines the suitability of different physical activities.



Vo₂ Max (Maximum Oxygen Uptake)

- ▶ VO₂ max is a measure of **endurance**. It can be calculated using high tech equipment or estimated using the Multi-Stage Fitness Test.
- ▶ A range of factors can affect your VO₂ Max.
 - ▶ Age
 - ▶ Gender
 - ▶ Genetics
 - ▶ Lifestyle
 - ▶ Training





Limitations of Testing

- ▶ The **limitations** of testing are:
 - ▶ tests are often **not sport specific** or too general.
 - ▶ they do not **replicate** the movements in activity.
 - ▶ they do not replicate **competitive** conditions.
 - ▶ some may not be **motivated** to perform at their maximum.
 - ▶ correct **procedures** must be used to increase validity.