

# **ROGER'S PHYSICAL FITNESS TEST**

**Programme: MPEd.**

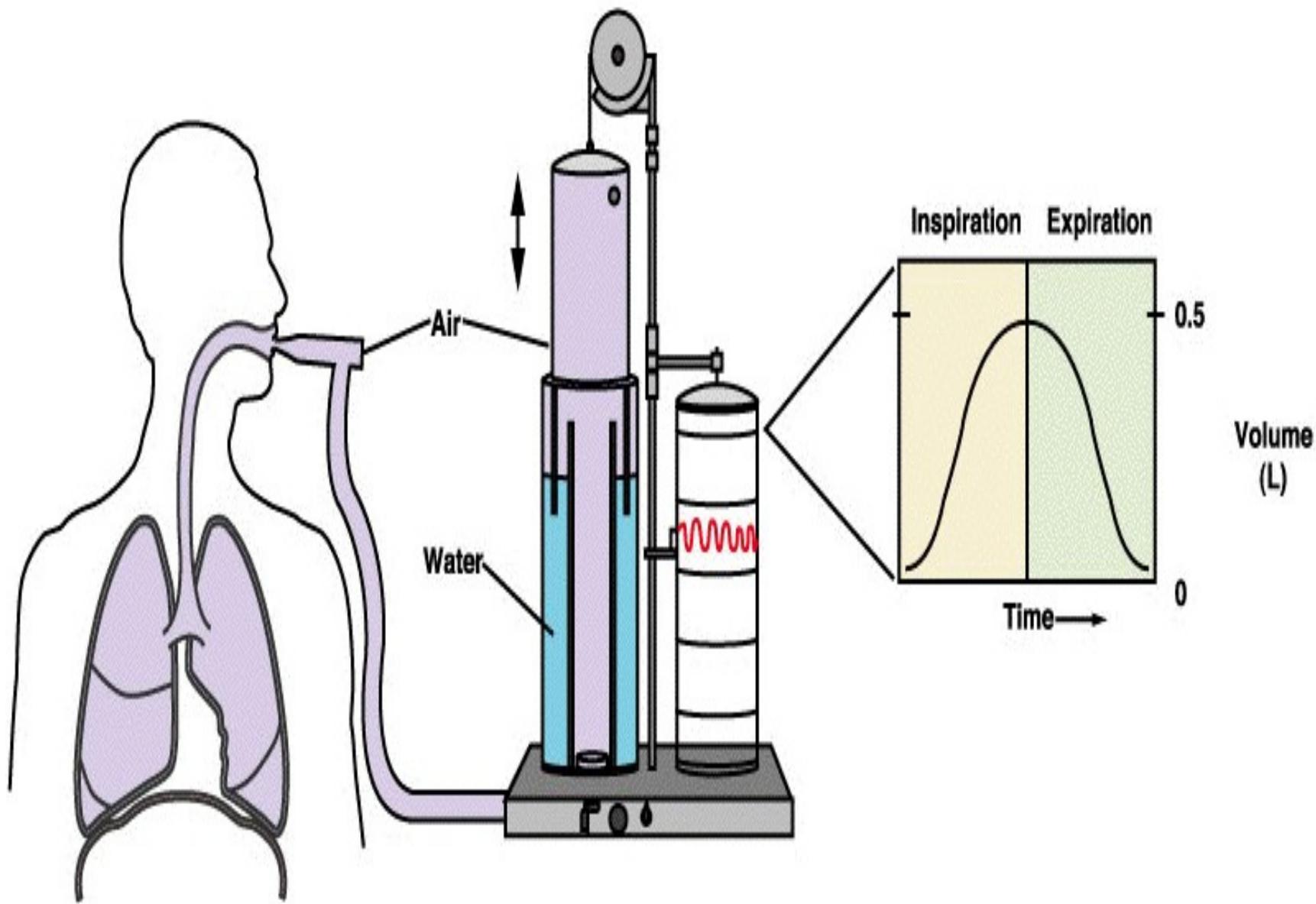
**Course: Measurement and Evaluation**

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- The physical fitness index is a score derived from comparing an achieved strength index with a norm based upon the individual's sex, weight, and age.
- It is a measure of basic physical fitness elements including both muscular strength and muscular endurance.
- **Sequence of test items**
  1. Age recorded in years and months
  2. Height to nearest half inch; subject in stocking feet
  3. Weight to nearest half pound; subject in gymnasium clothes and stocking feet.
  4. Lung capacity, using wet spirometer; recorded in cubic inches.
  5. Grip strength using a manometer, or hand dynamometer, of rectangular type; recorded in pounds.
  6. Back lift using dynamometer; recorded in pounds
  7. Leg lift using dynamometer, recorded in pounds
  8. Pull-ups: Boys horizontal bars with attached rings, recorded maximum number [chinning the bar] Pull-ups: (Girls) Rings attached to adjustable horizontal bar. Body at right angles to bar with heels under bar resting on floor. Recorded maximum number.
  9. Push-ups (Dips): Boys performed on parallel bars. Recorded maximum number. Push-ups (Girls) performed on stall bar bench - Recorded maximum number.

# Lung capacity :

- **This is the amount of air that can be expired after the deepest possible inspiration.**
- The **spirometer** should be placed at a height that allows the subject to stand erect at the beginning of the test.
- ii) The subject should then forcefully inhale and exhale twice before taking the test (**hyperventilate**).
- iii) The subject should be cautioned not to allow air to escape through his nose or around the mouth piece.
- iv) As the subject nears completion of the effort he should bend slightly forward to get as much as possible into the spirometer.
- v) The tester should watch needle to obtain the maximum reading.
- vi) An individual wooden/Paper mouth piece, the most hygienic, is used for each subject or a mouth piece may be used repeatedly if thoroughly sterilized by boiling, steaming, soaking in an antiseptic solution.



# Grip Strength:

- A **manuometer**, or **hand dynamometer** of the rectangular type, is used to measure grip strength, both right and left hands being tested.
  - 1) The subject's hands should be first chalked (**Magnesium carbonate** may be used) . Place the concave edge of the manometers between the first and second joints of the fingers with the dial toward the palm.
  - ii) The subject is allowed any movement while squeezing his instrument, provided he does not hit any object with his fist.
  - iii) The right grip is tested first and then the left. Scores should be read to the nearest pound.
  - iv) The indicator should be returned to zero after each test.



# Back lift

The **back and leg dynamometer** is the instrument used in measuring the strength of both back and leg muscles.

i) The subject (with the feet in proper position on the base of the dynamometer) stands on the dynamometer base, with feet parallel and about 6 inches apart.

The malleoli of the ankle joint should be as nearly opposite the attachment of the dynamometer to its base as possible.

ii) The subject stands with head erect, back straight, and chalked fingers extending down the thighs. The tester holds the bar at the lips of the subject's fingers to obtain proper adjustment. The bar is then connected to the chain.

iii) The subject bends slightly forward, with knees straight, and grasps the bar near either end with thumb clenching fingers and with one palm forward and one palm backward.

When the subject is in position to lift, the back should be slightly bent at the hips, so that he will not completely straighten when lifting, bent the legs should be straightened with no bend at the knees. The head should be up and eyes directed straight ahead.

iv) The subject is asked to lift straight up while the tester spots by placing his hands over the subject's to prevent the latter's hands from slipping.



# Leg Lift

Two methods have been proposed for administering the leg lift. These methods may be characterised as “without the belt” and “with belt”.

In order to obtain more objective results and to improve the validity of the PFI battery **the belt technique is preferred**. This is the most difficult test to administer.

- i) The subject assumes the same position as in the back lift. A belt is used around the subject's hip to stabilize the base, as the lifting force of the legs is too great to be held by the hands.
- ii) The subject holds the centre of the bar, palms down, at the level of the pubic bone.
- iii) As the tester faces the subject, the belt loop is attached to the left end of the base. The belt is then brought around the lower portion of the sacrum to be attached to the right end of the handle.
- iv) To make the attachment to the right side of the bar, proceed as follows: Form a loop in the belt by folding it back. The loop should be just opposite the end of the handle. Holding the loop in the left hand, reach down between the belt and the subject to grasp the end of the belt in the right hand. Slide the loop over the bar and pull the end of the belt up against the subject's hip.

With the belt in this position, the pulling force of the bar will hold the tail end of the belt against the subject's body, preventing the bar from sliding - similar to a timber hitch.

- v) The subject, with head up and back straight, bends at the knees. The handle is hooked into the chain so that the subject's knees are flexed between 115 and 125 degrees.
- vi) The bar will be on the subject's thigh during the lift. The subject may place his hands either in the middle or at the ends of the bar.
- vii) The subject is asked to lift straight up. At the completion of the lift the subject's knee joint should be almost completely extended to insure maximum effort
- viii) Record the best of two or three tests

# Pull-ups (Boys)

- The boys pull-up test is administered from a chinning bar to which preferably, rings have been attached. This arrangement permits the wrists to twist naturally as the subject performs the test. The rings should be high enough from the floor so that the feet of the tallest boy do not touch the floor when performing the test. If this is impossible, it will be necessary for tall individuals to bend their knees in order not to touch the feet on the floor in lowering the body to a straight arm hang.
- If rings are not available, the subjects should perform the pull-ups with forward hand grip
- 1. In taking pull up test, the subject hangs from the rings with complete extension of hands, and chin himself as many times as he can In executing the movement, he should pull himself up until his chin is even with his hands, then lower himself until his arms are straight. He should not be permitted to kick, jerk or use a kip motion.
- 2. Half counts are recorded if the subject does not pull all the way up, if he does not straighten his arms completely when lowering the body, or if he kicks, jerks, or kips in performing the movement. Only 4 half counts are permitted.

# Pull-ups (Girls)

- For girls' pull-up test, preferably, rings should be loosely attached (in order to permit the hands to twist naturally as the subject performs the test) to either an adjustable horizontal bar or on bar of the parallel bars which may be conveniently raised and lowered. A mat should be laid on the floor to prevent the feet from slipping. If rings are not available use forward hand grip.
- 1) The rings should be adjusted to approximately the height of the apex of the sternum, thus requiring each girl to pull approximately the same proportion of her weight. Time may be saved in adjusting the bar if the girls are arranged by heights at the beginning of the test.
- ii) The girls should grasp the rings with palms outward and slide her feet under the bar until the body and arms are approximately a right angle when the body is held straight. The weight should rest on the heels.
- iii) The test is to pull-up (with the body held perfectly straight) as many times as possible. The girls should pull a dead weight, the exercise being performed by the muscles of the arms and shoulder girdles only.
- iv) If the body sags, if the hips rise, or if the knees bend in a kip motion or if the subject does not pull completely up or go completely down, half credit only is given up to 4 half credits.
- **Gay apparatus**
- This device consists of a platform with an adjustable heel rest which may be raised or lowered depending upon the height of the girls being tested, the rings remaining at a fixed height.

# Pull-up test for Boys (Dips)

Parallel bars or wall parallel bars (or “dipping bars”) are used; The regulation parallel bars are preferred, since their width and height may be adjusted to the height of the subject.

1) The bars should be adjusted at approximately shoulder height.

ii) The subject should stand at the end of the parallel bars, grasping one bar in each hand. He jumps to the front support with arms straight (this counts one). He lowers his body until the angle of the upper arm and forearm is less than right angle, then pushes up to the straight arm position (this counts two) . This movement is repeated as many times as possible. The subject should not be permitted to jerk or kick or stop and rest when executing push-ups.

iii) At the first dip for each subject, the tester should gauge the proper distance the body should be lowered by observing the elbow angle. He should then hold his fist so that the subject's should just touches it on repeated tests.

iv) If the subject does not go down to proper bent arm angle or all the way up to a straight arm position, half credit only is given, upto four half credits.

# Push-up test for Girls

The push-up test for girl is executed from a stall bar bench, or a stool, 13 inches high by 20 inches long by 14 inches wide This should be placed on a mat about six inches from a wall so that subject will not take a position too far forward

i) The girl should grasp the outer edges of the bench or stool at the nearest corners and assume the front leaning rest position, with the balls of her feet resting on the mat and with her body and arms forming a right angle

ii) The test is to lower the body so that the upper chest touches the near edge of the stall bar bench, then raise it to a straight arm position as many times as possible In performing the test, the girl's body should be held straight throughout

iii) If the body sways or arches, or if the subject does not go completely down or does not push completely up, half-credit is given, up to four half credits

1) After four half credits have been recorded in push-up and pull-up tests for both boys and girls no more should be allowed for partial performance.

ii) After the fifth incomplete exercise, it is advisable to stop the test and repeat after a rest period.

iii) Counting should be audible to the subject, e count being made sharply and the end of each evolution and the reason for each half count briefly yen at the time it occurs.

iv) The subject should rest five minutes between 11 up and push up tests unless fewer than three counts ye been made. No rest periods are necessary between her parts of the test.

# SCORING

- Scoring of the Physical Fitness Index (PFI) is accomplished in the following manner:

- **Arm strength**

- Arm Strength for both boys and girls is computed by the following formula:

- $$\frac{W}{10} ( \text{Pull-ups} + \text{Push-ups} ) + H - 60$$

- W = Represents the weight in pounds

- H = Height in inches

- fractions are corrected to whole numbers. :

- **Example**

- Pull-ups 7 - Push-up 8. Height 68 inches weight 5 pounds.

- $$\frac{160}{10} (7+8) + 68 - 60$$

- = (15) (16+8)

- = 15 x 24 = 360 pounds

- **N.B :** If the subject is below 60 inches in height, the height should be disregarded in the formula.

- **Strength Index :**

- Strength index is the total score determined by adding together the scores made on each test item; lung capacity, right grip, left grip, back strength, leg strength, and arm strength.

# The Norm

- The norm charts are based upon sex, weight, and age, the normal score being changed for each two pound increase in weight and for each half year increase in age.
- Instead of interpolating to determine the norm for those individuals between points on the norm chart, the weight above and age below should be taken.
- For example, if an individual weighs 151 pounds the norm at 152 should be taken, if he is 16 years and 5 months of age, the norm at 16 years should be taken.

# Physical Fitness Index

The physical fitness index is computed from the following formula.

$$\text{PFI} = \frac{\text{Achieved SI}}{\text{Normal SI}} \times 100$$

For example, A boy's weight is 150 pounds; his age is 15 years; his obtained strength Index is 2200.

His normal SI (From the strength Index Norms table) is 2188.

$$\text{PFI} = \frac{2200}{2188} \times 100 = 101$$