

PHYSICAL FITNESS TEST MANUAL

There are two types of fitness:

Performance-related fitness is linked to athletic performance (for example: a 50-meter sprint or the ability to jump a desired distance to height) and is linked to speed, power, reaction time, and coordination.

Health-related fitness is linked to fitness components that may lower risks such as high blood pressure, diabetes, or low back pain. Health-related physical fitness includes the following components:

Aerobic fitness - ability of the heart and lungs to deliver blood to muscles,

Muscular strength and endurance - enough to do normal activities easily and protect the low back,

Flexibility - ability to move your many joints through their proper range of motion, and

Body composition - not too much body fat, especially around the waist. .

This manual focuses on the Health Related fitness using Physical Fitness Test battery standards adapted from FITNESSGRAM® by The Cooper Institute. For each test area, the FITNESSGRAM uses the Healthy Fitness Zone (HFZ)* to evaluate fitness performance. The performance goal for all test areas is the HFZ, which represents a level of fitness that offers protection against the diseases that result from sedentary living. If the performance goal is not met, the results are classified as Needs Improvement (NI) or, for Aerobic Capacity and Body Composition, Very Lean (Body Composition only) or Needs Improvement-Health Risk (NI-HR)

The tests battery include:

One-mile run, curl- up, trunk lift, 90° push up and modified sit and reach.

**Healthy Fitness Zone is from The Cooper Institute FitnessGram®, 2016.*

Aerobic Capacity

The Aerobic Capacity fitness area refers to the maximum rate that oxygen can be taken into and used by the body during exercise. Aerobic Capacity is considered important because of the research that associates good aerobic capacity in adults with a reduction in many health problems. One mile run is a test option provided to estimate aerobic capacity.



PHOTO © ViS. Figure 1. One-Mile Run

One-Mile Run* The One-Mile Run (Figure 1) estimates aerobic capacity from running performance. Students are instructed to run a mile as fast as possible. Walking is permitted for students who cannot run the total distance. The time taken to complete the run is recorded in minutes and seconds. Students who do not finish the One-Mile Run should be given a time of 59 minutes and 59 seconds. For these students, this test will be scored Incomplete and reported as Needs Improvement.

Equipment/Test Setting

For this test you must run all out for 1 mile (4 times around a standard quarter-mile track, located at many schools and some parks) and record your time. Keep in mind the need to pace yourself for the full 1.5 miles. We recommend that you take this test with a partner who can record your time and count laps. You may also want to keep track of your time using your own watch as a back-up.

Directions

1. Runner completes a warm-up of slow jogging.
2. The runner starts on the partner's command--when the partner starts the watch. Runner runs as quickly as possible for 1.5 miles.
3. The partner counts the number of laps and lets the runner know how many laps are left.
4. The partner stops the watch when the runner crosses the start/finish line and records the time.
5. The walker finds his/her pulse immediately and the partner provides a 10-second count using the stopwatch ("Ready, begin," and at end of 10 seconds, "Stop").
6. The partner records the pulse rate for 10 seconds and multiplies by six to have heart rate in beats per minute.
7. The partner records the time in minutes and seconds.
8. The runner cools down by jogging slowly until walking

Abdominal Strength and Endurance

Strength and endurance of the abdominal muscles are important in promoting good posture and correct pelvic alignment. The latter is particularly important in the maintenance of low back health. In testing and training the muscles of this region, it is difficult to isolate the abdominal muscles. The modified sit-up, which is used in many fitness tests, involves the action of the hip flexor muscles in addition to the abdominal muscles. The curl-up assessment used is a safer and more effective test since it does not involve the assistance of the hip flexor muscles and minimizes compression in the spine, when compared to a full sit-up with the feet held. The protocol has been adapted from a version reported by Massicote (1990).

Curl-Up*

This section provides information on the curl-up assessment. The curl-up with knees flexed and feet unanchored has been selected because individually these elements have been shown to:

- a) decrease movement of the fifth lumbar vertebra over the sacral vertebrae
- b) minimize the activation of the hip flexors
- c) increase the activation of the external and internal obliques and transverse abdominals and,
- d) maximize abdominal muscle activation of the lower and upper rectus abdominals relative to disc compression (load) when compared with a variety of sit-ups.

Few results are available on the consistency and accuracy of the curl-up. Reliability is higher for college students than for children but the values are acceptable for this type of assessment. Determination of validity has been hampered by the lack of an established criterion measure. Anatomical analysis and electromyographical documentation provide the primary support for the use of the curl-up test to determine abdominal strength and endurance.

Test Objective

To complete as many curl-ups as possible up to a maximum of 75 at a specified pace.

Equipment and Facilities

Gym mats and a measuring strip for every two students are needed. The measuring strip may be made of cardboard, rubber, smooth wood, or any similar thin, flat material and should be 30 to 35 inches long. Two widths of measuring strip may be needed. The narrower strip should be 3 inches wide and is used to test 5- to 9-year-olds; for older students the strip should be 4.5 inches wide.

Test Instructions

Allow students to select a partner. Partner A will perform the curl-ups while partner B counts and watches for form errors.

Partner A lies in a supine position on the mat, knees bent at an angle of approximately 140°, feet flat on the floor, legs slightly apart, arms straight and parallel to the trunk with palms of hands resting on the mat. The fingers are stretched out and the head is in contact with the mat. Make sure students have extended their feet as far as possible from the buttocks while still allowing feet to remain flat on floor. The closer the feet are positioned in relation to the buttocks, the more difficult the movement.

After partner A has assumed the correct position on the mat, partner B places a measuring strip on the mat under partner A's legs so that partner A's fingertips are just resting on the nearest edge of the measuring strip. Partner B then kneels down at partner A's head in a position to count curl-ups and watch for form breaks. Partner B places a piece of paper under partner A's head. The paper will assist partner B in judging if partner A's head touches down on each repetition. The observer should watch for the paper to crinkle each time partner A touches it with his or her head. .

Before beginning the curl-up, it is a good practice for partner B to pull on partner A's hands to ensure that the shoulders are relaxed and in a normal resting position. If partner A is allowed to hunch the shoulders before beginning the test, he or she may be able to get the fingertips to the other side of the testing strip by merely moving the arms and shoulders up and down. Keeping heels in contact with the mat, partner A curls up slowly, sliding fingers across the measuring strip until fingertips reach the other side; then partner A curls back down until his or her head touches the piece of paper on the mat. Movement should be slow and gauged to the specified cadence of about 20 curl-ups per minute (1 curl every 3 seconds). The teacher should call a cadence or use a prerecorded cadence. . Partner A

continues with-out pausing until he or she can no longer continue or has completed 75 curl-ups.



PHOTO © ViS. Starting position for the curl-up test.

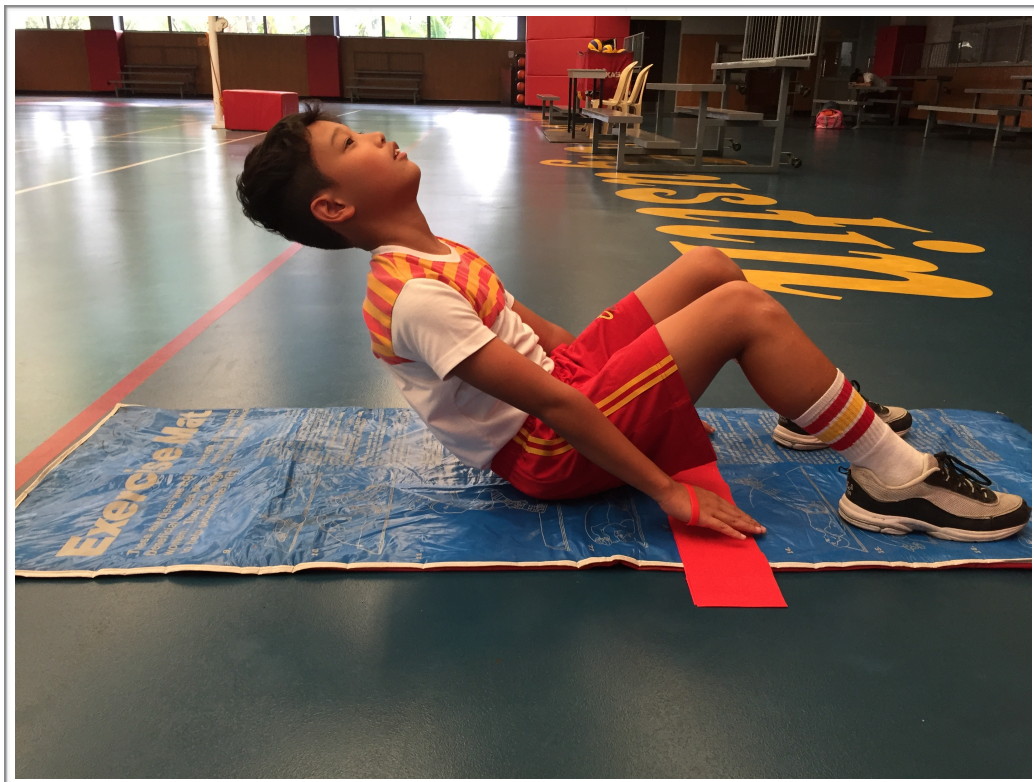


PHOTO © ViS. Position of the student in the "up" position for the curl-up test.

When to Stop

Students are stopped after completing 75 curl-ups, when the **second** form correction is made, or when they can no longer continue.

Form Corrections

- Heels must remain in contact with the mat.
- Head must return to the mat on each repetition.
- Pauses and rest periods are not allowed. The movement should be continuous and with the cadence.
- Fingertips must touch the far side of the measuring strip.

Scoring

The score is the number of curl-ups performed. Curl-ups should be counted when the student's head returns to the mat. For ease in administration, it is permissible to count the first incorrect curl-up. It is important to be consistent with all of the students and classes when determining whether or not you will count the first incorrect curl-up.

Suggestions for Test Administration

- The student being tested should reposition if the body moves so that the head does not contact the mat at the appropriate spot or if the measuring strip is out of position.
- Movement should start with a flattening of the lower back followed by a slow curling of the upper spine.
- The hands should slide across the measuring strip until the fingertips reach the opposite side (3 or 4.5 inches) and then return to the supine position. The movement is completed when the back of the head touches the paper placed on mat.
- The cadence will encourage a steady, continuous movement done in the correct form.

- Students should not forcibly “reach” with their arms and hands but simply let the arms passively move along the floor in response to the action of the trunk and shoulders. Any jerking, kipping, or reaching motion will cause the students to constantly move out of position. When students first begin to use this test item, many will want to “reach” with their arms and hands, especially if they have previously done a timed sit-up test.
- This curl-up protocol is quite different from the one-minute sit-up. Students will need to learn how to correctly perform this curl-up movement and be allowed time to practice.

Trunk Extensor Strength and Flexibility

A test of trunk extensor strength and flexibility is included in *FITNESSGRAM* because of its relationship to low back health, especially proper vertebral alignment. Musculoskeletal fitness of the abdominal muscles, hamstrings, and back extensors works in concert to maintain posture and helps maintain low back health. The item is included in the assessment in part because of the educational value of simply doing the assessment. Students will learn that trunk extensor strength and flexibility is an important aspect of maintaining a healthy back.

Trunk Lift*

It is important that attention be given to performance technique during this test. The movement should be performed in a slow and controlled manner. The maximum score on this test is 12 inches. While some flexibility is important, it is not advisable (or safe) to encourage hyperextension.

Test-retest studies of the trunk extension test (done without limiting the lift to 12 inches) have reported high reliability in high school and college aged students. There are no data on the consistency results for younger children.

Research results have shown that isokinetic trunk endurance, torso length, body weight, passive trunk extension, trunk extension endurance, trunk strength, and flexibility all contribute to performance of the trunk lift. However, a single repetition, partially body weight limited, restricted range item, this test is a minimal assessment of the components of trunk strength and flexibility. Most school-aged individuals will pass this test easily.

Test Objective

To lift the upper body off the floor using the muscles of the back and hold the position to allow for the measurement.

Equipment and Facilities

Gym mats and a measuring device are required to administer this test. A yardstick or 15-inch ruler is preferred; however a 12-inch ruler could be used if care is taken to make certain that the ruler is not placed directly under the student's chin. If students are measuring each other, the "rulers" should be made of some pliable material such as poster board. It is helpful to mark the 6-, 9-, and 12-inch marks

with tape. Rope cut to 12 inches with the inch marks taped can also be used as a measuring device.

Test Instructions

The student being tested lies on the mat in a prone position (facedown). Toes are pointed and hands are placed under the thighs. Place a coin or other marker on the floor in line with the student's eyes. During the movement, the student's focus should not move from the coin or marker. The student lifts the upper body off the floor, in a very slow and controlled manner, to a maximum height of 30 centimetres. The head should be maintained in a neutral (straight) alignment with the spine. The position is held long enough to allow the tester to place the ruler on the floor in front of the student and determine the distance from the floor to the student's chin. The ruler should be placed at least an inch to the front of the student's chin and not directly under the chin. Once the measurement has been made, the student returns to the starting position in a controlled manner. Allow two trials, recording the highest score.



PHOTO © ViS. Starting position of trunk lift.

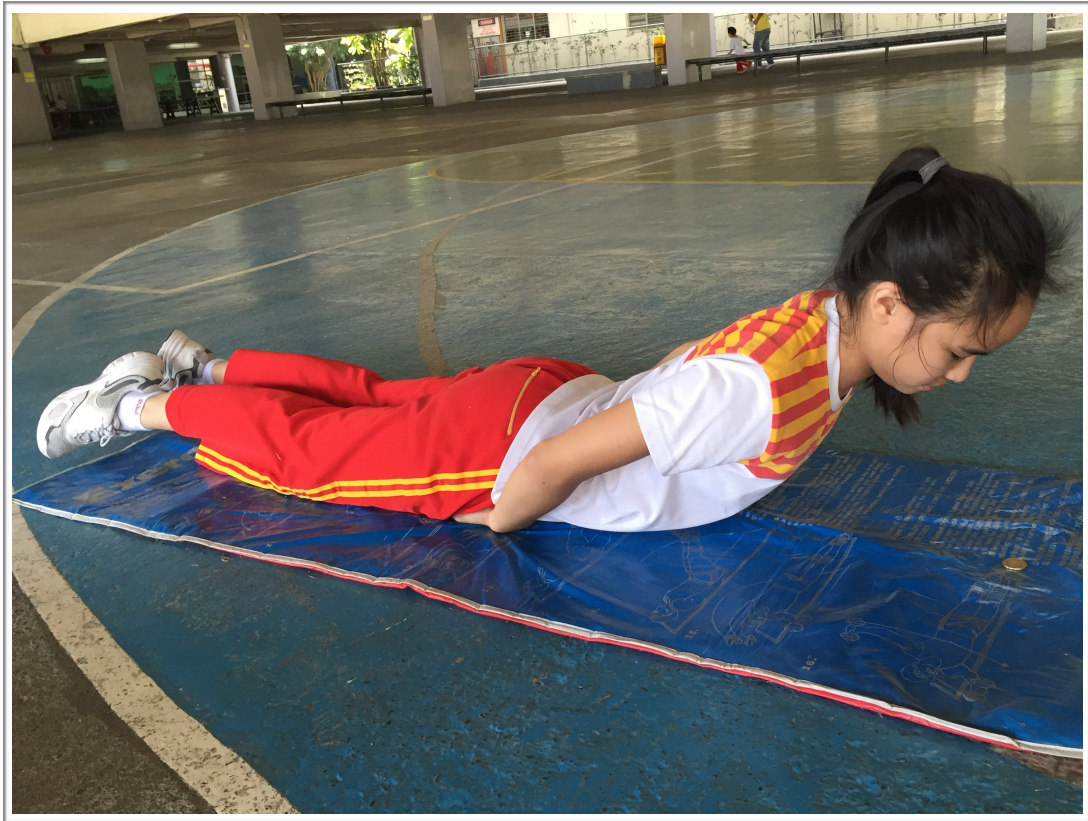


PHOTO © ViS. “Up” position of trunk lift.

Scoring

The score is recorded in centimetres. Distances above 30 centimetres should be recorded as centimetres.

Suggestions for Test Administration

- Do not allow students to do ballistic, bouncing movements.
- Do not encourage students to raise higher than 30 centimetres. The Healthy Fitness Zone ends at 30 centimetres, and scores beyond 30 centimetres will not be accepted by the . Excessive arching of the back may cause compression of the spinal discs.
- Maintaining focus on the spot on the floor should assist in maintaining the head in a neutral position.
- Partner B should make the reading at eye level and, therefore, should assume a squat or lying down position.

Upper Body Strength and Endurance

Strength and endurance of the muscles in the upper body are important in activities of daily living, maintaining functional health and promoting good posture. The role of upper body strength in maintaining functionality becomes more evident as a person ages. It is important that children and youth learn the importance of upper body strength and endurance as well as methods to use in developing and maintaining this area of fitness. The 90° push-up is the recommended test item. This 90° push-up has been adapted from assessments reported by Massicote (1990). Alternatives include the modified pull-up, pull-up, and flexed arm hang. It should be noted that although all of these items are intended to measure upper arm and shoulder girdle strength and endurance, they do not all involve the same muscle groups to the same extent and handling body weight is more of a factor in some than others.

90° Push-Up*

The 90° push-up to an elbow angle of 90° is the recommended test for upper body strength and endurance. Test administration requires little or no equipment; multiple students may be tested at one time; and few zero scores result. This test also teaches students an activity that can be used throughout life as a conditioning activity as well as in self-testing.

The 90° push-up has generally been shown to produce consistent scores but reliability depends on how it is administered. Lower values have been reported for elementary aged students using partners to count the repetitions. Objectivity, or the ability of different observers to attain the same results, is a factor in this item because of the necessity of judging the 90° angle. Scores from student partners are consistently higher than adult counts because students tend to simply count each attempted 90° push-up and not evaluate whether it was done correctly. As with several of the other neuromuscular fitness items, determining the accuracy of the 90° push-up as a test of upper body strength and endurance is made difficult by the lack of an agreed upon criterion measure. Specific validation data are available for the 90° push-up in only two studies conducted on college age students. Validity coefficients against a 1-RM bench press were the highest when the criterion test was the number of repetitions (endurance) at an absolute, but sex-specific, load.

Before test day, students should be allowed to practice doing 90° push-ups and watching their partner do them. Teachers should make a concerted effort during these practice sessions to correct students who are not achieving the 90° angle. In this manner all students will gain greater skill in knowing what 90° “feels like” and “looks like.”

Test Objective

To complete as many 90° push-ups as possible at a rhythmic pace. This test item is used for males and females.

Equipment and Facilities

The only equipment necessary is cadence. The correct cadence is 20 90° push-ups per minute (1 90° push-up every 3 seconds). The 90° push-up may be performed on a mat. Squares of cardboard or anything else that has a 90° angle may assist students in judging 90°.

Test Instructions

The students should be paired; one will perform the test while the other counts 90° push-ups and watches to see that the student being tested bends the elbow to 90° with the upper arm parallel to the floor.

The student being tested assumes a prone position on the mat with hands placed under or slightly wider than the shoulders, fingers stretched out, legs straight and slightly apart, and toes tucked under. The student pushes up off the mat with the arms until arms are straight, keeping the legs and back straight. The back should be kept in a straight line from head to toes throughout the test.

The student then lowers the body using the arms until the elbows bend at a 90° angle and the upper arms are parallel to the floor. This movement is repeated as many times as possible. The student should push up and continue the movement until the arms are straight on each repetition. The rhythm should be approximately 20 90° push-ups per minute or 1 90° push-up every 3 seconds.



PHOTO © ViS. Starting position for the 90° push-up test.

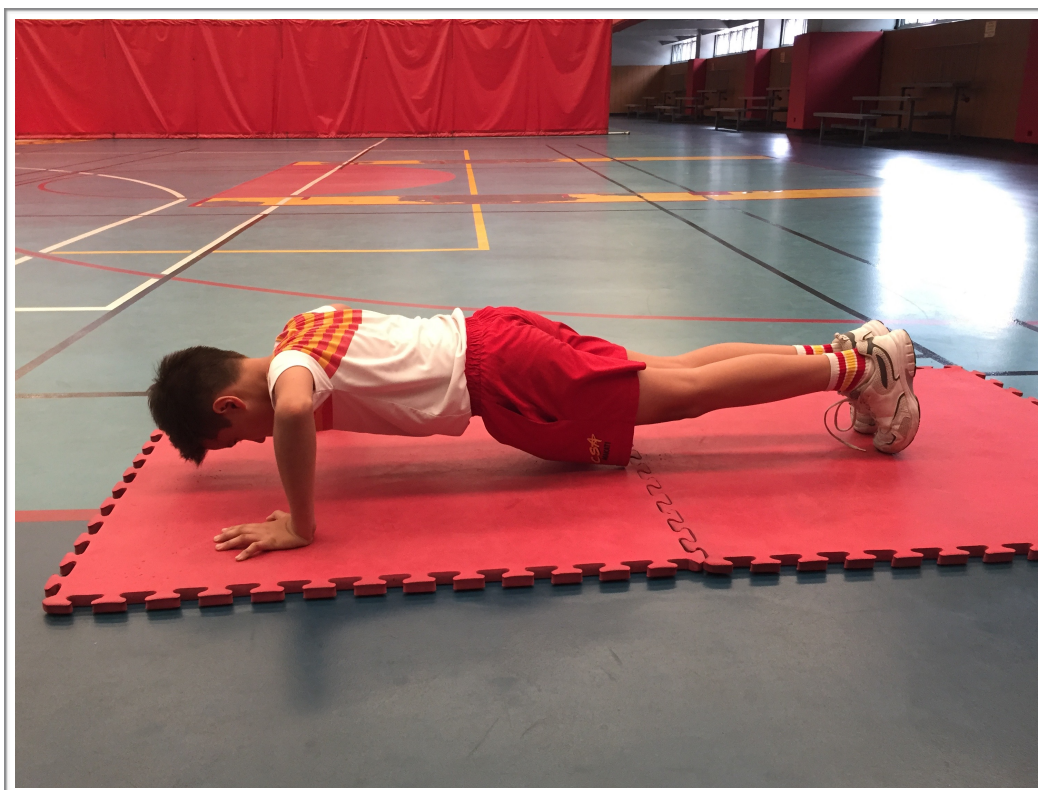


PHOTO © ViS. Down position for the 90° push-up test.

When to Stop

Students are stopped when the second form correction (mistake) is made. Only one form correction is allowed.

Form Corrections

- Stopping to rest or not maintaining a rhythmic pace
- Not achieving a 90° angle with the elbow on each repetition
- Not maintaining correct body position with a straight back
- Not extending arms fully

Scoring

The score is the number of 90° push-ups performed. For ease in administration, it is permissible to count the first incorrect 90° push-up. It is important to be consistent with all of the students and classes when determining if you will count the first incorrect push-up.

Suggestions for Test Administration

- Test should be terminated if the student appears to be in extreme discomfort or pain.
- Cadence should be called or played on a or CD.
- Males and females follow the same protocol
- Find a short cone or other piece of pliable equipment that could be placed under the student's chest. The student must lower to the equipment in order for the 90° push-up to count. The size and height of the equipment that is used may vary depending on the age and size of your students.

Flexibility

Maintaining adequate joint flexibility is important to functional health. However, for young people, decreased flexibility is generally not a problem. Many of your students will easily pass the flexibility item; therefore, the flexibility item has been made optional. If you decide not to administer the flexibility test, remember that you should teach students about flexibility and inform them that maintaining flexibility and range of motion will be important as they age.

Modified Sit and Reach*

The modified sit and reach is very similar to the traditional sit and reach except that the measurement is performed on one side at a time. By testing one leg at a time a determination can be made of any asymmetry in hamstring flexibility, and hyper- extension of both knees is avoided. The sit and reach measures predominantly the flexibility of the hamstring muscles. Normal hamstring flexibility allows rotation of the pelvis in forward bending movements and posterior tilting of the pelvis for proper sitting.

The modified sit and reach has been shown to provide extremely consistent scores when administered under standardized conditions. The back-saver sit and reach has also been shown to be a reasonably accurate measure of hamstring flexibility. When compared with criterion measures of hamstring flexibility, the correlations for both right and left legs have been moderate to high. Conversely, the back-saver sit and reach has been shown to correlate poorly with criterion tests of low back flexibility. Therefore, the back-saver sit and reach cannot be considered a valid measure of low back flexibility and should not be interpreted as such.

Test Objective

To be able to reach the specified distance on the right and left sides of the body. The distance required to achieve Healthy Fitness Zone is adjusted for age and gender.

Equipment and Facilities

This assessment requires a sturdy box approximately 12 inches high. A measuring scale is placed on top of the box with the 9-inch (22.5 cm) mark parallel to the face

of the box against which the student's foot will rest. The "zero" end of the ruler is nearest the student. However, a modified equipment like meter stick can be used placed on a bench measuring 12 inches.

Test Instructions

The student removes his or her shoes and sits down at the test apparatus. One leg is fully extended with the foot flat against the face of the box. The other knee is bent with the sole of the foot flat on the floor. The instep is placed in line with, and 2 to 3 inches to the side of, the straight knee. The arms are extended forward over the measuring scale with the hands placed one on top of the other. With palms down, the student reaches directly forward (keeping back straight and the head up) with both hands along the scale four times and holds the position of the fourth reach for at least 1 second. After one side has been measured, the student switches the position of the legs and reaches again. The student may allow the bent knee to move to the side as the body moves forward if necessary, but the sole of the foot must remain on the floor.



PHOTO © ViS. Starting position for the Sit and Reach. (L leg)



PHOTO © ViS.Reach position for the Sit and Reach. (L leg)

Scoring

Record the number of inches on each side to the nearest 1/2 inch reached, to a maximum score of 30 centimetres. Performance is limited to discourage hypermobility. To be in the Healthy Fitness Zone, the student should meet the standard on both the right and the left sides.

Suggestions for Test Administration

- The bent knee moves to the side, allowing the body to move past it, but the sole of the foot must remain on the floor.
- Keep the back straight and the head up during the forward flexion movement.
- The knee of the extended leg should remain straight. Tester may place one hand above the student's knee to help keep the knee straight.
- Hands should reach forward evenly.
The trial should be repeated if the hands reach unevenly or the knee bends.

- Hips must remain square to the box. Do not allow the student to turn the hip away from the box while reaching.

** OneMile Run, Curl Up, Trunk Lift, Sit and Reach, 90 degree Push Up tests are re-printed from the FITNESSGRAM® for the Presidential Youth Fitness Program. These test protocol are used with permission of The Cooper Institute, 12330 Preston Road, Dallas, TX 75230. Healthy Fitness Zone is from The Cooper Institute FitnessGram®, 2016.*