



SCHOOL PHYSICAL ACTIVITY & NUTRITION (SPAN) PROJECT HEIGHT PROTOCOL

Measurements should be taken in a remote area to ensure privacy and confidentiality for study participants. The use of screens is suggested.

A. TRAINING

1. Suggested Personnel for Training
 - a. Elementary: physical education (PE) specialists, school nurses, science or other interested teachers, parent volunteers, or a combination of these
 - b. Middle/Junior High: PE specialists, school nurses, science or other interested teachers, coaches, home economics/family life teachers, parent volunteers, or a combination of these
 - c. High School: PE specialists, school nurses, coaches, home economic teachers, health or other interested teachers, parent volunteers, or a combination of these
 - d. Nurses or staff from the local health department

B. MEASUREMENT SET-UP

1. Equipment and forms needed:
 - a. Stadiometer - A stadiometer is a vertical board with attached measurements and a movable horizontal board which can be brought down into contact with the head. Use the stadiometer provided by SPAN project staff.

DO NOT use the device attached to weighing scales sometimes used for measuring height (anthropometer). This device does not give an accurate measurement for height.

- b. School Physical Activity & Nutrition Questionnaire (height & weight section located on last page).
- c. SPAN Height Protocol

C. MEASUREMENT PROTOCOL

1. After students complete the SPAN Questionnaire, measure their height and weight.
2. Ask students to remove heavy outer clothing (such as coats, jackets and vests), purses, shoes, and hair accessories located on the top of the head. If the student cannot remove hair accessories, or has a hair style which prevents the board from touching the crown of the head, please make a note on the questionnaire in the “comments” section.
3. Instruct the student to stand with heels, buttocks and upper back (but not necessarily the head) touching the stadiometer and feet together, with arms hanging in a relaxed position by the sides of the body. The highest point on the skull or vertex is achieved when it is oriented in the Frankfort Plane. The Frankfort plane is the line from the lower edge of the eye socket (orbitale) to the notch above the flap of the ear (tragus) or the back of the cheekbone. These terms are illustrated in the diagram below. The critical feature of this technique is to obtain the maximum distance from the platform of the stadiometer to the subject’s vertex.

Terminology

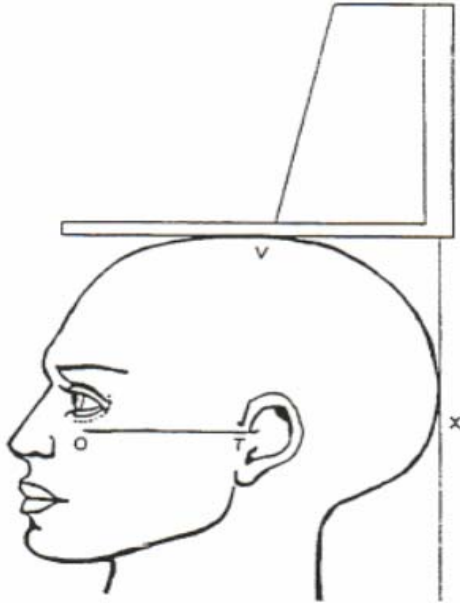
O---T = Frankfort Plane

V = Vertex

O = Orbital

T - Tragion

6. Instruct the student to take a deep breath, **hold their breath, look straight ahead**, and stretch up as far as possible while keeping the heels on the ground. Be sure and tell them when to breathe again.



7. The movable headboard on the stadiometer is moved down to the uppermost portion of the head, compressing the hair, if necessary. Lower the board until it firmly touches the crown of the head.

8. Adjust your eye level to the level of the measurement before attempting to read the measurement by standing on a step stool or squatting down. Read the measurement indicated at the **bottom of the right angle board**. If the measurement is compromised due to hair accessories or hairstyle, please make a notation in the “comments” section of the SPAN questionnaire. Also make a notation if the child has an abnormal condition that may interfere with the measurement, such as leg braces.

9. Record the measurement on the last page of the student SPAN Questionnaire to the nearest 1/10 cm in a 4-digit format.

10. If there is a discrepancy between the NCHS-NHANES video and the SPAN height protocol, follow the SPAN protocol.

References:

- Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey (NHANES III), Anthropometric Procedures Video, 1996.
- Child and Adolescent Trial for Cardiovascular Health (CATCH) Anthropometric Protocol, Protocol #522; November 1996.
- Kumanyika SK. Nutrition Surveillance of public school entrants. ASPH/CDC Cooperative Agreement Final Report, April, 1987.
- Lohman TG, Roche AF, Martorell R. Anthropometric Standardization Reference Manual. Champaign, Illinois: Human Kinetic Books, 1991.



SCHOOL PHYSICAL ACTIVITY & NUTRITION (SPAN) PROJECT WEIGHT PROTOCOL

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A. TRAINING

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 - d. Nurses or staff from the local health department

B. MEASUREMENT SET-UP

1. Equipment and forms needed:
 - a. Digital scale – Use the digital scale provided by SPAN project staff, ONLY.
 - b. School Physical Activity & Nutrition Questionnaire (height & weight section located on last page).
 - c. SPAN weight protocol
2. Calibration of Scales (**Recommended**)

Calibrate each scale with standardized weights at each of the four weight levels (i.e. 50, 100, 150, 200 pounds or 20, 40, 70, 90 kilograms) each morning before the start of measurement. This can be done at a central location or on site at the school.

Scales should be evaluated if they mis-measure standards in any one of the four standard levels by more or less than 0.2kg (.5 pounds). If this happens, first replace the battery and repeat the calibration procedures precisely as described above. Be sure that the scale is placed on a level floor surface without carpet or rugs of any kind. Check that the scale is programmed to the kilogram mode and that it balances at zero before your test.

If the scale still mis-measures the standards by more or less than 0.2kg., do not use the scale for measurement. Follow the manufacturer's recommendations for reconditioning.

Acceptable range for calibration of scales using pound weights:

Standard Weight in lb	Evaluate scale if weight is more or less than as follows:
50 lb	<49.5 lb or > 50.5 lb
100 lb	<99.5 lb or > 100.5 lb
150 lb	<149.5 lb or > 150.5 lb
200 lb	<199.5 lb or > 200.5 lb

Acceptable range for calibration of scales using kilogram weights (1kg = 2.2046 lb):

Standard Weight in kg	Evaluate Scale if weight is more or less than as follows:
20 kg	< 19.8 kg or > 20.2 kg
40 kg	< 39.8 kg or > 40.2 kg
70 kg	< 69.8 kg or > 70.2 kg
90 kg	< 89.2 kg or > 90.2 kg

C. MEASUREMENT PROTOCOL

1. Before each measurement, make sure the scale is zero-balanced. The digital scale will register three zeros across the display, then will register one zero. If the digital scale does not register zero, do not use it.
2. Be sure that the scale is placed on a level floor surface without carpet or rugs of any kind.
3. Ask the student to remove heavy outer clothing (such as coats, jackets, and vests), purses, shoes, and any heavy accessories such as belts with heavy belt buckles. The student should also remove everything from their pockets including money (coins), pens, pencils, wallets, and papers.



4. Make sure the scale is zero-balanced before **each** student is weighed and that the scale is programmed in kilogram mode. There is a button on the back of the scale that switches the mode between kilograms and pounds.
5. Ask the student to stand motionless in the middle of the scale platform with the feet slightly apart and the body weight distributed equally on both feet. The arms should be relaxed and hanging down loosely at the sides of the body. The digital scale is very sensitive so any movement by the student will change the weight measurement so student must stand very still.
6. Digital scales do not register over 400 lbs. If a student weighs over the limit of the scale, the scale will register an “error”. If this happens or if the reading is compromised due to a cast or other device, please make a notation on the questionnaire in the “comments” section.
7. **Do not react to the student’s weight. While the weight measurement is being taken, it is important not to be judgmental. Any communication about the weight should be neutral (neither positive or negative) and professional.**
8. Record the reading on the last page of the SPAN Questionnaire in a 4-digit format to the nearest 0.1 kg. Ask the student to step down from the scale.
9. Turn the scale off after each reading.
10. **If there is a discrepancy between the NCHS-NHANES video and the SPAN weight protocol, follow the SPAN protocol.**

References:

- Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey (NHANES III), Anthropometric Procedures Video, 1996.
- Child and Adolescent Trial for Cardiovascular Health (CATCH) Anthropometric Protocol, Protocol #522; November 1996.
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Height and Weight Measurement Tips

BEFORE ALL MEASUREMENTS

- Remove shoes
- Remove all heavy outer clothing such as coats, jackets, vests, and sweatshirts.
- Remove belts with heavy belt buckles
- Remove hair accessories from the top of the head

HEIGHT MEASUREMENT

STUDENT POSITIONING

- Heels, buttocks and upper back against the stadiometer
- Look straight ahead with arms at sides
- Feet together
- Take deep breath, stretch up as far as possible, keep heels on ground
- Check Frankfort Plane
- Read measurement at eye level
- No carpets
- Use a right angle board on the stadiometer

WEIGHT MEASUREMENT

STUDENT POSITIONING

- Calibrate the scale
- Feet together with hands at sides
- Weight equally on both feet
- Stand still, scale if very sensitive



Quality Control Protocol

In order to assess and maintain quality of anthropometric (height/weight) measurements of students, the following protocol for quality assurance will be followed.

Quality control measures (height and weight) will be taken on at least 5% of the students chosen randomly from those measured on a particular day at each school. The repeat measurements must not be consecutive; the examiner should measure at least five other students before the designated students undergo repeat measurements. SEE THE CHART BELOW FOR AN EXAMPLE OF THE NUMBER OF QUALITY CONTROL MEASURES THAT NEED TO BE COMPLETED.

Repeat measurements should be recorded on the Quality Control Form (included). Do not change the recorded measurements on the form even if the QC and the original measurements are different.

For example: Jane is planning to measure 25 students on Monday. Jane will randomly pick 2 students to participate in the QC. After measuring one of the students who will participate in the QC, the student is asked to remain in the waiting area away from measurement. After Jane has measured at least five other students, she will re-measure the QC student and record the measurements on the SPAN QC Anthropometric form.

Number of Students	Minimum Number of Students for Quality Control Checks
1-20	1
21- 59	2
60 - 79	3
80 - 99	4
100 - 119	5

Certification Activity for Height and Weight Measurements

1. What clothing items should be removed prior to height measurement?
 - a. All clothing except underclothing.
 - b. Heavy outer clothing (coats, jackets and vests), shoes, and hair accessories located on the top of the head
 - c. Shoes
 - d. Heavy outer clothing such as coats, jackets, vests, shoes and heavy accessories such as belts with heavy belt buckles

2. Height measurement should be made . . .
 - a. against a wall with a baseboard.
 - b. using a stadiometer.
 - c. against a wall without a baseboard.
 - d. b or c

3. What should be used to make contact with the student's head during a height measurement?
 - a. a ruler.
 - b. a cardboard box
 - c. a right angle board
 - d. a book with a right angle

4. Which three parts of the body should be in contact with the stadiometer when measuring height?
 - a. the buttocks, heels and the upper part of the back
 - b. the head, shoulder blades and heels
 - c. the head, buttocks and heels
 - d. the head, the upper part of the back and the heels

5. When reading a height measurement, the eye level should be adjusted to the level of measurement.
 - a. True
 - b. False

6. During height measurement, the student should:
 - a. look straight ahead
 - b. stretch up as far as possible
 - c. keep both heels on the ground
 - d. take a deep breath
 - e. all of the above

7. What is the Frankfort plane?
 - a. The Frankfort plane is the straight vertical line from the crown of the head to the feet. The subject should be standing tall during height measurement so that the body is positioned in the Frankfort plane.
 - b. The Frankfort plane is the line from the lower edge of the eye socket to the notch above the flap of the ear or the back of the cheekbone. The head should be positioned in the Frankfort plane for height measurement.

8. What clothing items should be removed prior to a weight measurement?
 - a. Heavy outer clothing such as coats, jackets, vests, shoes and heavy accessories such as belts with heavy belt buckles.
 - b. All clothing except underclothing.
 - c. Heavy outer clothing (coats, jackets and vests), shoes, and hair accessories located on the top of the head.
 - d. Shoes

9. What type of scale may be used to measure weight.
 - a. A bathroom scale
 - b. A digital scale
 - c. A beam scale with moveable weights

10. Before *each* student is weighed . . .
 - a. The appropriate clothing items should be removed.
 - b. The scale should be zero-balanced and/or calibrated and in the kilogram mode.
 - c. The student should remove coins from the pockets.
 - d. All of the above.

11. To what closest increment should weight measurement be read?
 - a. To the nearest one-half kilogram (0.5)
 - b. To the nearest kilogram (1)
 - c. To the nearest one-tenth kilogram (0.1)

Certification Activity Answer Key

1. b. Heavy outer clothing (coats, jackets and vests), shoes, and hair accessories located on the top of the head.
2. b. A stadiometer should always be used for height measurement.
3. c. A right angle board should be used to measure height. This allows for an accurate measurement of height at the crown of the head.
4. a. the buttocks, heels and the upper part of the back
5. True
6. e. All of the above
7. b. It is important to position the head in the Frankfort plane to get an accurate height measure at the crown of the head.
8. a. Heavy outer clothing such as coats, jackets and vests; shoes, and heavy accessories such as belts with heavy belt buckles.
9. b. A digital scale must be used.
10. d. All of the above
11. c. To the nearest one-tenth (0.1 kg)