



LAB 6.1 Assessing Body Mass Index and Body Composition



Body Mass Index

Equipment

1. Weight scale
2. Tape measure or other means of measuring height

Instructions

Measure your height and weight, and record the results. Be sure to record the unit of measurement.

Height: _____ Weight: _____

Calculating BMI (see also the shortcut chart of BMI values in Lab 6.2)

1. Convert your body weight to kilograms by dividing your weight in pounds by 2.2.
 Body weight _____ lb \div 2.2 lb/kg = body weight _____ kg
2. Convert your height measurement to meters by multiplying your height in inches by 0.0254.
 Height _____ in. \times 0.0254 m/in. = height _____ m
3. Square your height measurement.
 Height _____ m \times height _____ m = height _____ m²
4. BMI equals body weight in kilograms divided by height in meters squared (kg/m²).
 Body weight _____ kg \div height _____ m² = BMI _____ kg/m²
(from step 1) (from step 3)

Rating Your BMI

Refer to the table for a rating of your BMI. Record the results below and on the final page of this lab.

Classification	BMI (kg/m ²)
Underweight	<18.5
Normal	18.5–24.9
Overweight	25.0–29.9
Obesity (I)	30.0–34.9
Obesity (II)	35.0–39.9
Extreme obesity (III)	\geq 40.0

(See complete version of table on p. 174 for additional information.)

BMI _____ kg/m²

Classification (from table) _____



Skinfold Measurements

Equipment

1. Skinfold calipers
2. Partner to take measurements
3. Marking pen (optional)

Instructions

1. *Select and locate the correct sites for measurement.* All measurements should be taken on the right side of the body with the subject standing. Skinfolts are normally measured on the natural fold line of the skin, either vertically or at a slight angle. The skinfold measurement sites for males are chest, abdomen, and thigh; for females, triceps, suprailium, and thigh. If the person taking skinfold measurements is inexperienced, it may be helpful to mark the correct sites with a marking pen.



(a) Chest (b) Abdomen (c) Thigh (d) Triceps (e) Suprailium

(a) *Chest.* Pinch a diagonal fold halfway between the nipple and the shoulder crease. (b) *Abdomen.* Pinch a vertical fold about 1 inch to the right of the umbilicus (navel). (c) *Thigh.* Pinch a vertical fold midway between the top of the hipbone and the kneecap. (d) *Triceps.* Pinch a vertical skinfold on the back of the right arm midway between the shoulder and elbow. The arm should be straight and should hang naturally. (e) *Suprailium.* Pinch a fold at the top front of the right hipbone. The skinfold here is taken slightly diagonally according to the natural fold tendency of the skin.

2. *Measure the appropriate skinfolts.* Pinch a fold of skin between your thumb and forefinger. Pull the fold up so that no muscular tissue is included; don't pinch the skinfold too hard. Hold the calipers perpendicular to the fold and measure the skinfold about 0.25 inch away from your fingers. Allow the tips of the calipers to close on the skinfold and let the reading settle before marking it down. Take readings to the nearest half-millimeter. Continue to repeat the measurements until two consecutive measurements match, releasing and repinching the skinfold between each measurement. Make a note of the final measurement for each site.

Time of day of measurements: _____

Men

Women

Chest: _____ mm

Triceps: _____ mm

Abdomen: _____ mm

Suprailium: _____ mm

Thigh: _____ mm

Thigh: _____ mm



Determining Percent Body Fat

Add the measurements of your three skinfolts. Use this sum as a point of comparison for future assessments and/or find the percent body fat that corresponds to your total in the appropriate table. For example, a 19-year-old female with measurements of 16 mm, 19 mm, and 22 mm would have a skinfold sum of 57 mm; according to the table on page 183, her percent body fat is 22.7.

Sum of three skinfolts: _____ mm Percent body fat: _____ %

Percent Body Fat Estimate for Women: Sum of Triceps, Suprailium, and Thigh Skinfolts

Sum of Skinfolts (mm)	Age								
	Under 22	23–27	28–32	33–37	38–42	43–47	48–52	53–57	Over 57
23–25	9.7	9.9	10.2	10.4	10.7	10.9	11.2	11.4	11.7
26–28	11.0	11.2	11.5	11.7	12.0	12.3	12.5	12.7	13.0
29–31	12.3	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3
32–34	13.6	13.8	14.0	14.3	14.5	14.8	15.0	15.3	15.5
35–37	14.8	15.0	15.3	15.5	15.8	16.0	16.3	16.5	16.8
38–40	16.0	16.3	16.5	16.7	17.0	17.2	17.5	17.7	18.0
41–43	17.2	17.4	17.7	17.9	18.2	18.4	18.7	18.9	19.2
44–46	18.3	18.6	18.8	19.1	19.3	19.6	19.8	20.1	20.3
47–49	19.5	19.7	20.0	20.2	20.5	20.7	21.0	21.2	21.5
50–52	20.6	20.8	21.1	21.3	21.6	21.8	22.1	22.3	22.6
53–55	21.7	21.9	22.1	22.4	22.6	22.9	23.1	23.4	23.6
56–58	22.7	23.0	23.2	23.4	23.7	23.9	24.2	24.4	24.7
59–61	23.7	24.0	24.2	24.5	24.7	25.0	25.2	25.5	25.7
62–64	24.7	25.0	25.2	25.5	25.7	26.0	26.7	26.4	26.7
65–67	25.7	25.9	26.2	26.4	26.7	26.9	27.2	27.4	27.7
68–70	26.6	26.9	27.1	27.4	27.6	27.9	28.1	28.4	28.6
71–73	27.5	27.8	28.0	28.3	28.5	28.8	29.0	29.3	29.5
74–76	28.4	28.7	28.9	29.2	29.4	29.7	29.9	30.2	30.4
77–79	29.3	29.5	29.8	30.0	30.3	30.5	30.8	31.0	31.3
80–82	30.1	30.4	30.6	30.9	31.1	31.4	31.6	31.9	32.1
83–85	30.9	31.2	31.4	31.7	31.9	32.2	32.4	32.7	32.9
86–88	31.7	32.0	32.2	32.5	32.7	32.9	33.2	33.4	33.7
89–91	32.5	32.7	33.0	33.2	33.5	33.7	33.9	34.2	34.4
92–94	33.2	33.4	33.7	33.9	34.2	34.4	34.7	34.9	35.2
95–97	33.9	34.1	34.4	34.6	34.9	35.1	35.4	35.6	35.9
98–100	34.6	34.8	35.1	35.3	35.5	35.8	36.0	36.3	36.5
101–103	35.3	35.4	35.7	35.9	36.2	36.4	36.7	36.9	37.2
104–106	35.8	36.1	36.3	36.6	36.8	37.1	37.3	37.5	37.8
107–109	36.4	36.7	36.9	37.1	37.4	37.6	37.9	38.1	38.4
110–112	37.0	37.2	37.5	37.7	38.0	38.2	38.5	38.7	38.9
113–115	37.5	37.8	38.0	38.2	38.5	38.7	39.0	39.2	39.5
116–118	38.0	38.3	38.5	38.8	39.0	39.3	39.5	39.7	40.0
119–121	38.5	38.7	39.0	39.2	39.5	39.7	40.0	40.2	40.5
122–124	39.0	39.2	39.4	39.7	39.9	40.2	40.4	40.7	40.9
125–127	39.4	39.6	39.9	40.1	40.4	40.6	40.9	41.1	41.4
128–130	39.8	40.0	40.3	40.5	40.8	41.0	41.3	41.5	41.8

SOURCE: Jackson, A. S., and M. L. Pollock. 1985. Practical assessment of body composition. *Physician and Sportsmedicine* 13(5): 76–90. Reproduced by permission of The McGraw-Hill Companies.

Percent Body Fat Estimate for Men: Sum of Chest, Abdomen, and Thigh Skinfolts

Sum of Skinfolts (mm)	Age								
	Under 22	23–27	28–32	33–37	38–42	43–47	48–52	53–57	Over 57
8–10	1.3	1.8	2.3	2.9	3.4	3.9	4.5	5.0	5.5
11–13	2.2	2.8	3.3	3.9	4.4	4.9	5.5	6.0	6.5
14–16	3.2	3.8	4.3	4.8	5.4	5.9	6.4	7.0	7.5
17–19	4.2	4.7	5.3	5.8	6.3	6.9	7.4	8.0	8.5
20–22	5.1	5.7	6.2	6.8	7.3	7.9	8.4	8.9	9.5
23–25	6.1	6.6	7.2	7.7	8.3	8.8	9.4	9.9	10.5
26–28	7.0	7.6	8.1	8.7	9.2	9.8	10.3	10.9	11.4
29–31	8.0	8.5	9.1	9.6	10.2	10.7	11.3	11.8	12.4
32–34	8.9	9.4	10.0	10.5	11.1	11.6	12.2	12.8	13.3
35–37	9.8	10.4	10.9	11.5	12.0	12.6	13.1	13.7	14.3
38–40	10.7	11.3	11.8	12.4	12.9	13.5	14.1	14.6	15.2
41–43	11.6	12.2	12.7	13.3	13.8	14.4	15.0	15.5	16.1
44–46	12.5	13.1	13.6	14.2	14.7	15.3	15.9	16.4	17.0
47–49	13.4	13.9	14.5	15.1	15.6	16.2	16.8	17.3	17.9
50–52	14.3	14.8	15.4	15.9	16.5	17.1	17.6	18.2	18.8
53–55	15.1	15.7	16.2	16.8	17.4	17.9	18.5	19.1	19.7
56–58	16.0	16.5	17.1	17.7	18.2	18.8	19.4	20.0	20.5
59–61	16.9	17.4	17.9	18.5	19.1	19.7	20.2	20.8	21.4
62–64	17.6	18.2	18.8	19.4	19.9	20.5	21.1	21.7	22.2
65–67	18.5	19.0	19.6	20.2	20.8	21.3	21.9	22.5	23.1
68–70	19.3	19.9	20.4	21.0	21.6	22.2	22.7	23.3	23.9
71–73	20.1	20.7	21.2	21.8	22.4	23.0	23.6	24.1	24.7
74–76	20.9	21.5	22.0	22.6	23.2	23.8	24.4	25.0	25.5
77–79	21.7	22.2	22.8	23.4	24.0	24.6	25.2	25.8	26.3
80–82	22.4	23.0	23.6	24.2	24.8	25.4	25.9	26.5	27.1
83–85	23.2	23.8	24.4	25.0	25.5	26.1	26.7	27.3	27.9
86–88	24.0	24.5	25.1	25.7	26.3	26.9	27.5	28.1	28.7
89–91	24.7	25.3	25.9	26.5	27.1	27.6	28.2	28.8	29.4
92–94	25.4	26.0	26.6	27.2	27.8	28.4	29.0	29.6	30.2
95–97	26.1	26.7	27.3	27.9	28.5	29.1	29.7	30.3	30.9
98–100	26.9	27.4	28.0	28.6	29.2	29.8	30.4	31.0	31.6
101–103	27.5	28.1	28.7	29.3	29.9	30.5	31.1	31.7	32.3
104–106	28.2	28.8	29.4	30.0	30.6	31.2	31.8	32.4	33.0
107–109	28.9	29.5	30.1	30.7	31.3	31.9	32.5	33.1	33.7
110–112	29.6	30.2	30.8	31.4	32.0	32.6	33.2	33.8	34.4
113–115	30.2	30.8	31.4	32.0	32.6	33.2	33.8	34.5	35.1
116–118	30.9	31.5	32.1	32.7	33.3	33.9	34.5	35.1	35.7
119–121	31.5	32.1	32.7	33.3	33.9	34.5	35.1	35.7	36.4
122–124	32.1	32.7	33.3	33.9	34.5	35.1	35.8	36.4	37.0
125–127	32.7	33.3	33.9	34.5	35.1	35.8	36.4	37.0	37.6

SOURCE: Jackson, A. S., and M. L. Pollock. 1985. Practical assessment of body composition. *Physician and Sportsmedicine* 13(5): 76–90. Reproduced by permission of The McGraw-Hill Companies.

Rating Your Body Composition

Refer to the figure to rate your percent body fat. Record it below and in the chart at the end of this lab.

Rating: _____

Percent Body Fat Classification

	Percent Body Fat (%)				Percent Body Fat (%)		
	20–39 years	40–59 years	60–79 years		20–39 years	40–59 years	60–79 years
Women				Men			
Essential ^a	8–12	8–12	8–12	Essential ^a	3–5	3–5	3–5
Low/athletic ^b	13–20	13–22	13–23	Low/athletic ^b	6–7	6–10	6–12
Recommended	21–32	23–33	24–35	Recommended	8–19	11–21	13–24
Overfat ^c	33–38	34–39	36–41	Overfat ^c	20–24	22–27	25–29
Obese ^c	≥39	≥40	≥42	Obese ^c	≥25	≥28	≥30

The cutoffs for recommended, overfat, and obese ranges in this table are based on a study that linked body mass index classifications from the National Institutes of Health with predicted percent body fat (measured using dual energy X-ray absorptiometry).

^aEssential body fat is necessary for the basic functioning of the body

^bPercent body fat in the low/athletic range may be appropriate for some people as long as it is not the result of illness or disordered eating habits; see pp. 172–173 for more on low levels of percent body fat.

^cHealth risks increase as percent body fat exceeds the recommended range.

SOURCES: Gallagher, D., et al. 2000. Healthy percentage body fat ranges: An approach for developing guidelines based on body mass index. *American Journal of Clinical Nutrition* 72: 694–701. American College of Sports Medicine. 2001. *ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription*. 4th ed. Philadelphia: Lippincott, Williams and Wilkins.

Other Methods of Assessing Percent Body Fat

If you use a different method, record the name of the method and the result below and in the chart at the end of this lab. Find your body composition rating on the chart above.

Method used: _____ Percent body fat: _____ % Rating (from chart above): _____

Waist Circumference and Waist-to-Hip Ratio

Equipment

1. Tape measure
2. Partner to take measurements

Preparation

Wear clothes that will not add significantly to your measurements.

Instructions

Stand with your feet together and your arms at your sides. Raise your arms only high enough to allow for taking the measurements. Your partner should make sure the tape is horizontal around the entire circumference and pulled snugly against your skin. The tape shouldn't be pulled so tight that it causes indentations in your skin. Record measurements to the nearest millimeter or one-sixteenth of an inch.

Waist. Measure at the smallest waist circumference. If you don't have a natural waist, measure at the level of your navel. Waist measurement: _____

Hip. Measure at the largest hip circumference. Hip measurement: _____

Waist-to-Hip Ratio: You can use any unit of measurement (for example, inches or centimeters), as long as you're consistent. Waist-to-hip ratio equals waist measurement divided by hip measurement.

$$\text{Waist-to-hip ratio: } \frac{\text{_____}}{\text{(waist measurement)}} \div \frac{\text{_____}}{\text{(hip measurement)}} = \text{_____}$$

Determining Your Risk

The table below indicates values for waist circumference and waist-to-hip ratio above which the risk of health problems increases significantly. If your measurement or ratio is above either cutoff point, put a check on the appropriate line below and in the chart at the end of this lab.

Waist circumference: _____ (✓ high risk) Waist-to-hip ratio: _____ (✓ high risk)

Body Fat Distribution

Cutoff Points for High Risk

	Waist Circumference	Waist-to-Hip Ratio
Men	more than 40 in. (102 cm)	more than 0.94
Women	more than 35 in. (88 cm)	more than 0.82

SOURCES: National Heart, Lung, and Blood Institute. 1998. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*. Bethesda, Md.: National Institutes of Health. American College of Sports Medicine. 2001. *ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription*, 4th ed. Philadelphia: Lippincott, Williams and Wilkins.

Rating Your Body Composition

Assessment	Value	Classification
BMI	_____ kg/m ²	_____
Skinfold measurements or alternative method of determining percent body fat Specify method: _____	_____ % body fat	_____
Waist circumference	_____ in. or cm	_____ (✓ high risk)
Waist-to-hip ratio	_____ (ratio)	_____ (✓ high risk)

Using Your Results

How did you score? Are you at all surprised by your ratings for body composition and body fat distribution? Are your current ratings in the range for good health? Are you satisfied with your current body composition? Why or why not?

If you're not satisfied, set a realistic goal for improvement: _____

What should you do next? Enter the results of this lab in the Preprogram Assessment column in Appendix D. If you've determined that you need to improve your body composition, set a specific goal by completing Lab 6.2, and then plan your program using the labs in Chapters 8 and 9 and the weight management section of the Daily Fitness and Nutrition Journal. After several weeks or months of an exercise and/or dietary change program, complete this lab again and enter the results in the Postprogram Assessment column of Appendix D. How do the results compare?