

Initials__ Student ID#_____ Tu/Th M/F Age__ Hgt__ Wgt__

Nutrition Lab

Dr. J. Lim

PART ONE: Basal Metabolic Rate

Calculating Daily Energy Required for Basal Metabolic Rate

Basal metabolism is the minimum amount of energy the body needs at rest in the fasting state. The basal metabolic rate (BMR) is the rate at which kcal are spent for these at rest activities that maintain life such as the beating of the heart, breathing, maintaining body temperature, and sending nerve impulses.

Factors affecting BMR

BMR varies according to a person's sex, age, and amount of body surface area.

- Body style: a tall, thin person has a higher BMR than a short, stout person
- Age: the younger the person, the more likely it is that cell division is occurring; therefore, BMR is higher for younger persons than for older persons
- Sex: males have a higher BMR than females because males have a greater percentage of muscle tissue

The experimental procedure for calculating BMR takes all these factors into consideration.

EXPERIMENTAL PROCEDURE

1. Use the bathroom scale and measuring stick to determine your weight and height. It is assumed that you are fully clothed and wearing shoes with a 1-inch heel. Be honest about your weight. There is no need to tell anyone else.
2. Body Surface Area. Use the data you have just collected and Table 1 to determine your body surface area. Using a straight edge, draw a straight line from your height to your weight. The point where that line crosses the middle column shows your surface area in square meters. For example, a person who is 6 ft tall and weighs 170 lbs has a body surface area of 1.99 square meters.

What is your body surface area? _____

3. Hourly BMR. Use Table 2 to find the BMR constant for your age and sex. Multiply your surface area by this factor to calculate your BMR/hr. For example, a 17-year old male has a BMR constant of 41.5kcal/m²hr. If his surface area is 1.99m², his BMR is 82.6kcal/hr.

What is your BMR/hr? _____

4. Daily BMR. Multiply your hourly rate by 24 to obtain the total number of kcal you need for BMR/day. For example, if the BMR is 82.6kcal/hr, then the daily BMR rate is 1,982kcal/day.

What is your BMR/day? _____

Table 1
Nomogram to estimate body surface area from height and weight.

A straight line is drawn from the subject's height (Scale 1) to the subject's weight (Scale 3). The point at which the line intersects Scale 2 is the subject's body surface area in m² (meters squared).

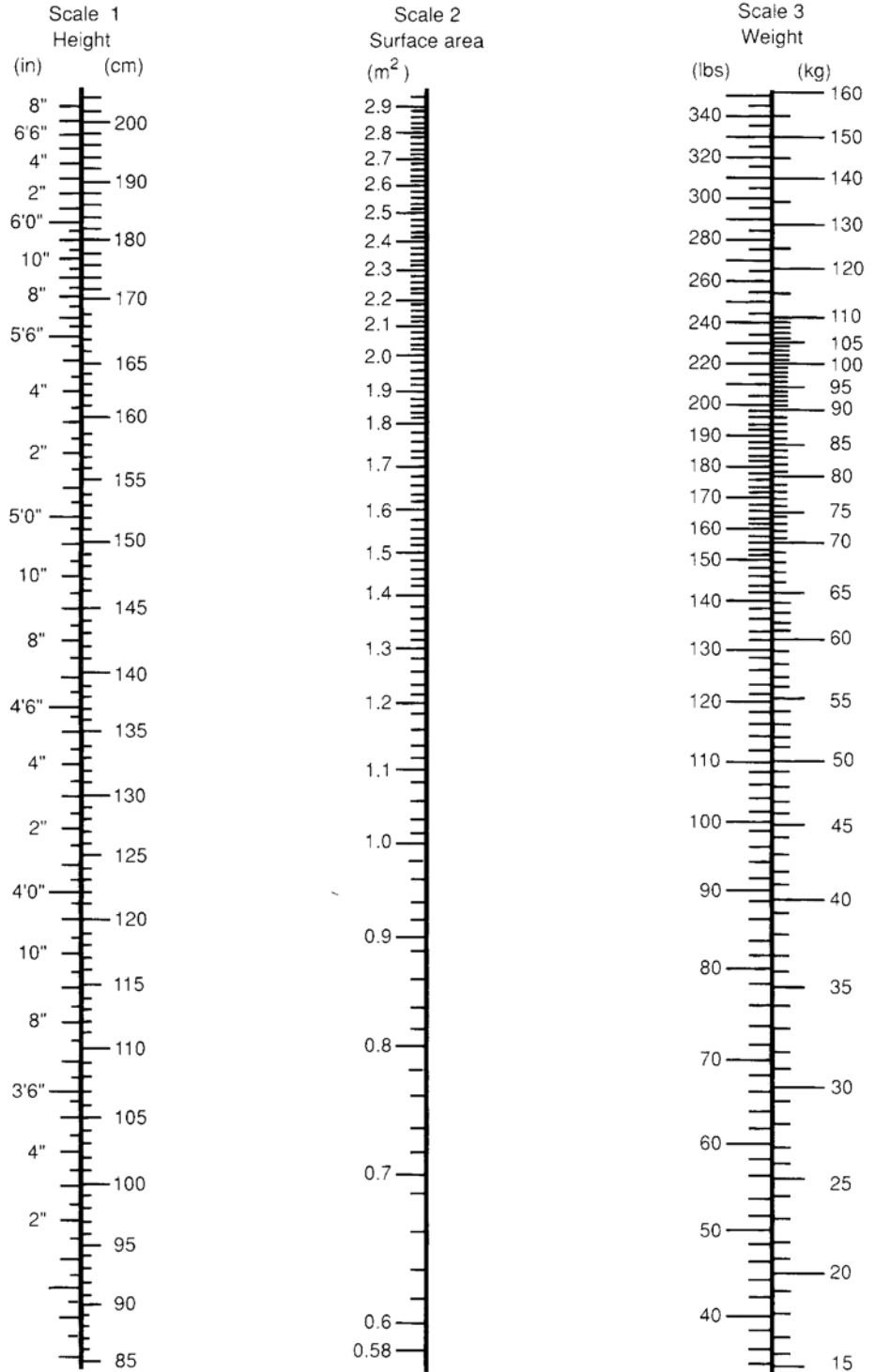


Table 2 Basal Metabolic Rate Constants

<i>BMR (Kcal/m² hr)</i>			<i>BMR (Kcal/m² hr)</i>		
Age	Males	Females	Age	Males	Females
10	47.7	44.9	29	37.7	35.0
11	46.5	43.5	30	37.6	35.0
12	45.3	42.0	31	37.4	35.0
13	44.5	40.5	32	37.2	34.9
14	43.8	39.2	33	37.1	34.9
15	42.9	38.3	34	37.0	34.9
16	42.0	37.2	35	36.9	34.8
17	41.5	36.4	36	36.8	34.7
18	40.8	35.8	37	36.7	34.6
19	40.5	35.4	38	36.7	34.5
20	39.9	35.3	39	36.6	34.4
21	39.5	35.2	40–44	36.4	34.1
22	39.2	35.2	45–49	36.2	33.8
23	39.0	35.2	50–54	35.8	33.1
24	38.7	35.1	55–59	35.1	32.8
25	38.4	35.1	60–64	34.5	32.0
26	38.2	35.0	65–69	33.5	31.6
27	38.0	35.0	70–74	32.7	31.1
28	37.8	35.0	75+	31.8	

Compare your results with one of these two online BMR calculators:

<http://health.discovery.com/tools/calculators/basal/basal.html>

<http://www.mistupid.com/fitness/bmr.htm>

How do your calculations compare with the online value?

PART TWO: Assessing Your Personal Fitness Level

In this exercise you will determine your personal fitness level based upon body mass and fat measurements using BMI guidelines set by the World Health Organization (WHO) and body fat recommendations are from the American Journal of Clinical Nutrition.

Measuring BMI & Body Fat Percentage:

- Determine your weight and height using the bathroom scale and wall height chart
- Wash and dry your hands before handling the measuring device
- Set personal data on Omron Body Fat Analyzer **before** taking measurements
 - Set the following data points
 - guest
 - normal or serious athlete
 - height (1/4 inch increments)
 - weight in pounds
 - age
 - gender

How to Measure: Start the Measurement

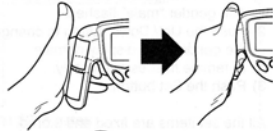
3. Start the measurement.

When the values are set to height of 6' 3 1/4, weight of 149 lbs., age 37 years old, and gender male:

- 1) Stand with both feet slightly apart.



- 2) Hold the grip electrodes. Wrap your middle finger around the groove of the handle. Place the palm of your hand on the top and the bottom electrodes. Put your thumbs up, resting on top of the unit.



- 3) Hold your arms straight out, at a 90 degree angle to your body. Do not move during the measurement.



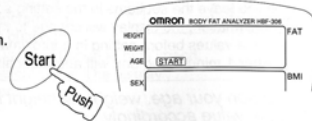
- 4) Confirm the ready to measure display.

The **READY** indicator turns on.



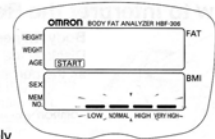
- 5) Push the Start button.

The display **START** turns on.



- 6) Hold the electrodes with both hands. The unit automatically detects that it is held and starts measurement.

The display flashes one by one and moves to the right end.



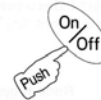
The BMI judgment bar turns on immediately after the body fat percentage and the BMI are displayed. (The bar at the right end flashes). You can start another measurement when the **READY** indicator turns on.



For how to interpret the measurement results in detail, please refer to the following page.

- 7) Push the On/Off button to turn the power off.

If you do not push the On/Off button, the unit will turn off automatically in approximately three minutes after displaying the measurement results.



Measuring postures that should be avoided

Measurement in the following positions may not provide accurate measurement.

Elbows are bent.



Moving your body or arms during measurement



Arms are positioned too upward or downward of the desirable angle to the body.



Measuring while lying down or sitting



How to hold the grips.

In the following cases, the electric resistance may not be measured correctly.

Your fingers are apart from the grips.



When holding the grips, the hands are positioned unevenly towards the top or the bottom of the electrodes.



NOTE: These recommendations are for informational purposes only and should not be considered or used as medical guidelines for weight loss, exercise, or dietary changes. Always consult with your physician before beginning any weight loss or exercise program or when making changes to your diet

Background Information: The Omron HBF-306 Body Fat Analyzer displays the estimated value of body fat percentage by the Biomedical Impedance (BI) method and indicates the body mass in four ranges of LOW, NORMAL, HIGH< and VERY HIGH according to the BMI value.

The Biomedical Impedance method passes a safe, low-level electrical signal through the body. It is difficult for the signal to flow through fat in the human body, but easy to flow through moisture in the muscle and other body tissues. The difficulty with which a signal flows through a substance is called impedance. So the amount of fat in the body can be accurately estimated by measuring the impedance. The signal used is very low-level, making it safe and imperceptible.

Body Mass Index (BMI) is an internationally used index to show the body condition by checking the balance between the height and the weight. It is calculated by using the following formula: BMI:

$$\text{Body Mass Index} = (\text{weight (lbs)} \times 703 / \text{height}^2 (\text{in}^2))$$

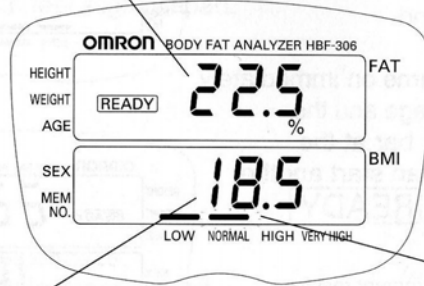
$$\text{BMI in metric} = \text{weight (kg)} / \text{height}^2 (\text{m}^2)$$

Follow the directions above to attain your personal readings

How to Interpret the Results

Body fat percentage

Displays the body fat mass as the percentage of body weight.



BMI classification

Displays LOW, NORMAL, HIGH, or VERY HIGH.

BMI

BMI is an internationally used index to show the body condition by checking the balance between the height and the weight.

It is calculated by the following formula:

BMI: Body Mass Index = (weight (lbs) x703) / height (in) / height (in)

BMI in metric = weight (kg) / height (m) / height (m)

Recommended Body Fat Ranges and BMI

	Age	Low (BMI < 18.5)	Recommended (BMI 18.5-24.9)	High (BMI 25-29.9)	Very High (BMI > 30)
Female	20-39	5-20	21-33	34-38	>38
	40-59	5-22	23-34	35-40	>40
	60-79	5-23	24-36	37-41	>41
Male	20-39	5-7	8-20	21-25	>25
	40-59	5-10	11-21	22-27	>27
	60-79	5-12	13-25	26-30	>30

Based on NIH/WHO guidelines for BMI

Based on Gallagher et al., American Journal of Clinical Nutrition, Vol.72, Sept. 2000

BMI	BMI (Designation by the WHO)
Less than 18.5	LOW (Low)
18.5 or more and less than 25	NORMAL (Normal)
25 or more and less than 30	HIGH (Pre-obese)
30 or more	VERY HIGH (Obesity)

The above-mentioned indices refer to the values for obesity judgment proposed by the WHO, the World Health Organization.

Your Body Fat _____ % **Your BMI** _____

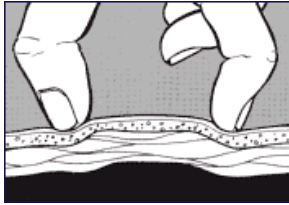
Skinfold websites:

<http://btc.montana.edu/olympics/physiology/pb03.html>

http://www.mhhe.com/hper/physed/clw/webreview/web12/IPT15_AssessingBodyFat.doc

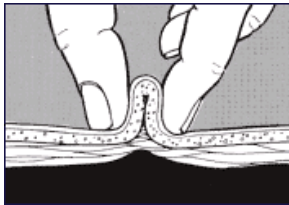
Measuring Body Fat Percentage with Skinfold Calipers:

Skinfold measurements are made with skinfold calipers. The following procedures must be used for each skinfold site:



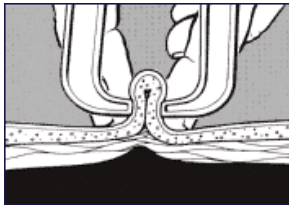
Use your thumb and index finger of both hands to “draw up” an area of skin and fat wide enough to get a good fold.

“Draw up” the skinfold in a vertical line. Do not pinch the skinfold.



You do not have to worry about getting any muscle as the muscle is firm and will not come into a fold with the skin and fat.

Once you have drawn the skinfold, let go with one hand and pick up the caliper.



While holding the skinfold with one hand, place the jaws of the calipers about 1/4" from the pinch site. Release the trigger of the caliper so the entire force of the jaws are on the skinfold. Without releasing the skinfold, let the force of the caliper creep a bit for a few seconds to settle to the correct reading.

Record three measurements at each site. Use the average to determine your site measurement and then proceed to the next location.

Skinfold locations for women

- Triceps - One half the distance between the shoulder and elbow, use your dominant side _____mm
- Iliac Crest - Diagonally on the natural line of the skin on the iliac crest _____mm
- Abdominal - One inch to the right of the navel _____mm



Skinfold locations for men

- Thigh – Vertically on front of thigh midway between the hip and knee _____mm
- Chest - Above and to right of right nipple. May be done diagonally _____mm
- Abdominal - One inch to the right of the navel _____mm

Calculating fatness from the skinfold

- Sum the three skinfolds
- Use the skinfold sum and your age to determine your percent fat in the body composition chart below.

RESULTS: Sum of Skinfolds _____mm → Your Body Fat _____%

Chart 13.1 Percent Fat Estimates for Men, Sum of Chest, Abdominal, and Thigh Skinfolds*									
Age to the Last Year									
Sum of Skinfolds (mm)	22 and Under	23 to 27	28 to 32	33 to 37	38 to 42	43 to 47	48 to 52	53 to 57	Over 58
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	18.1	18.8
53-55	15.1	15.7	16.2	16.8	17.4	17.9	18.5	18.2	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	25.5	26.3	26.9	27.5	28.1	28.7
89-91	24.7	25.3	25.9	25.7	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

Chart 13.2 Percent Fat Estimates for Women, Sum of Triceps, Iliac Crest, and Thigh Skinfolds*

Sum of Skinfolds (MM)	Age to the Last Year								
	22 and Under	23 to 27	28 to 32	33 to 37	38 to 42	43 to 47	48 to 52	53 to 57	Over 58
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	26.2	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	28.0	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

Q: How does this reading compare with that obtained with the hand-held bio-impedance device? How can you explain the difference in readings? _____



Waist-to-Hip Ratio (WHR)

People with a lot of abdominal fat (that is, an apple-shaped body) are at increased risk for cardiovascular disease, type 2 diabetes, hypertension and other conditions. In contrast, a larger hip circumference (a pear-shaped body) may actually be somewhat protective, especially in women. The waist-to-hip ratio (**WHR**)—or even just a waist measurement alone—is thus a good way to assess your overall health risk, because it takes both factors into account.

Measuring your waist

It may not be where your belt is. You should measure at the narrowest point between the lower rib and the top of the hip bone, or at the midpoint in between. Do not suck in your belly. If you can't find the narrowest point (it may be difficult if you're very overweight), measure just above your belly button.

Measuring your hips

Measure your hips at the widest part of your buttocks as viewed from the side. To calculate the ratio, divide the waist number by the hip number.

Record your WHR _____

A waist-to-hip ratio above 0.9 for men and 0.85 for women indicates above-average risk; above 1.0 for men and 0.95 for women, high risk. Measuring just your waist is also an accurate gauge: more than 40 inches for men or 35 inches for women indicates high risk. However, these are not magical numbers; there's some evidence that risk starts to rise before those cutoff points.

PART THREE: SuperTracker (revised 2-12)

SuperTracker, produced by the USDA Center for Nutrition Policy and Promotion (CNPP), is the next generation interactive tool for personalized diet and physical activity planning, assessment and analysis.

The 172 page SuperTracker User Guide can be viewed at

<https://www.choosemyplate.gov/SuperTracker/Documents/SuperTrackerUserGuide.pdf>

Guidelines for creating a SuperTracker report on yourself:

1. Record intake/activity for an average day on the old MyPyramid Worksheet (pg11).
2. log on to <https://www.choosemyplate.gov/SuperTracker/default.aspx>
3. click the blue Create Your Profile (below "Get Started" on the right side)
4. Personalize Your Profile
 - select your profile name (7 characters only)
 - enter Age, Gender, Physical Activity Level, Height & Weight
5. Register to Save Your Profile
 - enter Username, Password, Security Question & email address
6. Submit
7. Go to the blue ribbon at the top of the screen
 - click Track Food & Activity

- select Food Tracker from drop down menu
8. On Food Tracker page
- select date on upper left
 - NOTE your accumulated totals for Physical Activity Target, Daily Calorie Limit and Daily Food Group Targets will appear to the right of the date
 - these totals will change as you enter data
 - time to enter in great detail what you ate on the subject day
 - use the old MyPyramid worksheet as a guide
 - i. remember added condiments (ex: mayo), drinks, side orders (ex: chips), snacks (ex: candy bars) and desserts (ex: ice cream)
 - at Search: bar
 - i. use drop down menu to select a food category (ex: snacks)
 - ii. type a specific food type (ex: Snickers) into box to right to refine search
 - 1. drop down menu may appear
 - iii. choose an amount (quantity/volume) & meal time/snack
 - iv. click Add to add to your intake list
9. REPEAT Step 8 for everything you ate on the subject date
- after entry of all ingested food, snacks and beverages proceed to Step 10
10. Return to the button on the dark blue ribbon at the top of the screen
- click Track Food & Activity
 - select Physical Activity Tracker from the drop down menu
11. On Physical Activity Tracker page
- time to enter in great detail your physical activity on the subject day
 - include everyday activities like cooking, cleaning, childcare, etc
 - at Search: bar
 - i. use drop down menu to select an activity category or leave on ALL ACTIVITIES
 - ii. type a specific activity (ex: cycling) into box at right to refine search
 - iii. move slightly right and click Go
 - complete Activity Details for refined search, duration and relevant day(s)
 - click Add to add to your activity list
12. Return to the dark blue ribbon at the top of the SuperTracker page
- click Track Food & Activity
 - select **Food Tracker** from drop down menu
 - be sure to set the proper date on the upper left
 - Print the summary of your data by either clicking
 - i. Print Page at the upper left of the screen followed by blue Print button at bottom of page (use Landscape setting to print **FoodTracker**) *OR*
 - ii. Export Report As PDF on the upper right and then printing the PDF
13. Return to the dark blue ribbon at the top of the page and click My Reports
- set proper date > click Create Report > click Print to print the reports for
 - i. **Food Groups & Calories**
 - ii. **Nutrients Report**
 - iii. **Physical Activity**
 - set proper date > choose ALL meals > Create Report > Print to print report for
 - i. **Meal Summary**
14. **Attach the five (5) summaries to the end of this lab report**

PART FOUR: Food Label Analysis

Examine the entire U.S. Food and Drug Administration (FDA) publication entitled “Eating Healthier and Feeling Better using the Nutrition Facts Label” at either the class website at or <http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm266853.htm>

An excerpt from this FDA document follows on the next page.

Next, use this information to scrutinize the label on a unit of packaged food from your cupboard at home. You may either affix the food label to this sheet or transfer its information below.

Product Analyzed: _____

- Serving size
- Calories
- Total fat
- Saturated fat
- Unsaturated fat
- Trans fat
- Cholesterol
- Sodium
- Total Carbohydrate
- Dietary fiber
- Sugars
- Protein
- Vitamin A
- Vitamin C
- Calcium
- Iron

Food Label REPORT

List the good and bad aspects of your chosen food followed by a discussion of its nutritional value. If possible, include the actual label or a copy of it. Should that be difficult, just record the “Nutrition Facts.”

PART FIVE: Personal Health and Fitness Summary

Citing your personal readings for BMR, Fat %, BMI, and your MyPyramid Energy Balance (food intake versus physical activity) Summary plus utilizing your knowledge of food labels, describe your presumed state of health and fitness. What is likely to occur if the current trend continues over the next twenty-years? What changes (if any) in diet and/or physical activity would better your chances of a long and healthy life?

Write your self-analysis report on a separate sheet of paper and submit it detached from this packet. Be sure to write your name and lab section on the upper right corner.



Dietary Guidelines 2010 Selected Messages for Consumers

Take action on the Dietary Guidelines by making changes in these three areas.

Choose steps that work for you and start today.

Balancing Calories

- Enjoy your food, but eat less.
- Avoid oversized portions.

Foods to Increase

- Make half your plate fruits and vegetables.
- Make at least half your grains whole grains.
- Switch to fat-free or low-fat (1%) milk.

Foods to Reduce

- Compare sodium in foods like soup, bread, and frozen meals—and choose the foods with lower numbers.
- Drink water instead of sugary drinks.



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