RJL SYSTEMS

Name:					Test Date:		5:32 PM; August 1, 2016		
Subject ID:					Report Printed on:		1:56 PM; August 18, 2016		

Height	Weight	Age	Sex	Resistance	Reactance	Frame	Target Wt.	Activity Level	Equation Set
65.0 in	124.0 lbs	56	Female	583.0 Ω	53.0 Ω	Small	125.0 lbs	Light	NHANES-III

Current Test Data

	Amount				
Weight	124.0 lbs	**% of Weight**			
Fat	31.9 lbs	25.7 %			
Fat-Free Mass (FFM)	92.1 lbs	74.3 %	**% of FFM**		
Lean Dry Mass (LDM)	23.5 lbs	18.9 %	25.5 %		
Total Body Water (TBW)	68.7 lbs	55.4 %	74.5 %	**% of TBW**	
Intra-Cellular Water (ICW)	35.7 lbs	28.8 %	38.7 %	52.0 %	
Extra-Cellular Water (ECW)	33.0 lbs	26.6 %	35.8 %	48.0 %	
Bone Mineral Content (BMC)	5.4 lbs	4.4 %	5.9 %		
Lean Soft Tissue (LST)	86.7 lbs	69.9 %	94.1 %	**% of LST**	
Skeletal Muscle Mass (SMM)	38.3 lbs	30.9 %	41.6 %	44.2 %	

BMI	20.6		**Phase Angle**	5.2
FMI	5.3		**Basal Metabolic Rate (BMR)**	1,407.0 kCal
FFMI	15.3		**Daily Energy Expenditure (DEE)**	2,110.5 kCal

Estimated Complete Body Composition
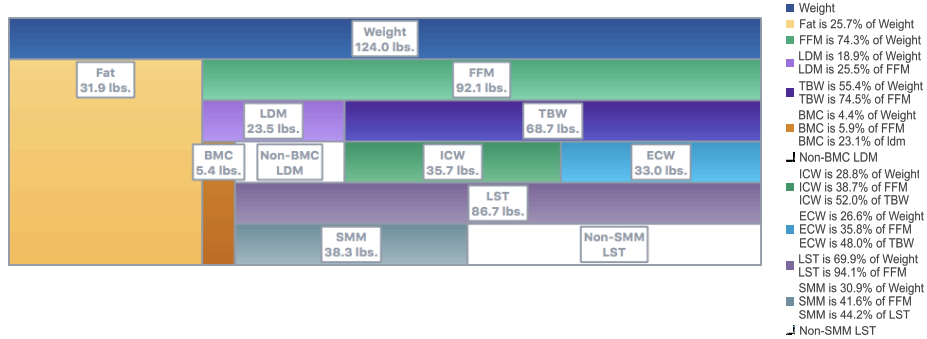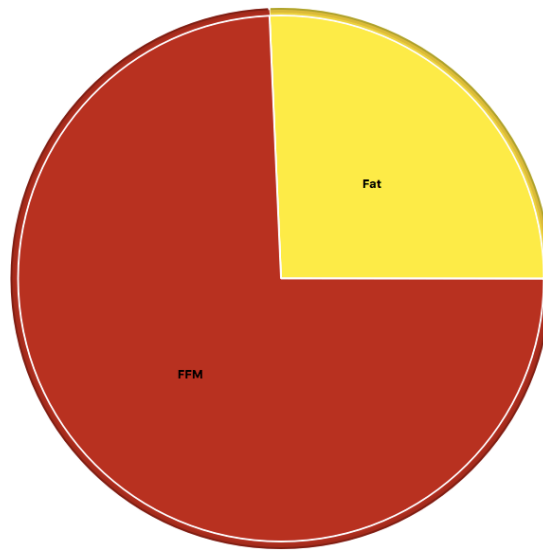
- Weight
- Fat is 25.7% of Weight
- FFM is 74.3% of Weight
- LDM is 18.9% of Weight
- LDM is 25.5% of FFM
- TBW is 55.4% of Weight
- TBW is 74.5% of FFM
- BMC is 4.4% of Weight
- BMC is 5.9% of FFM
- BMC is 23.1% of ldm
- Non-BMC LDM
- ICW is 28.8% of Weight
- ICW is 38.7% of FFM
- ICW is 52.0% of TBW
- ECW is 26.6% of Weight
- ECW is 35.8% of FFM
- ECW is 48.0% of TBW
- LST is 69.9% of Weight
- LST is 94.1% of FFM
- SMM is 30.9% of Weight
- SMM is 41.6% of FFM
- SMM is 44.2% of LST
- Non-SMM LST

Estimated Body Composition

Fat

FFM

Estimated Fluids Distribution

ICW
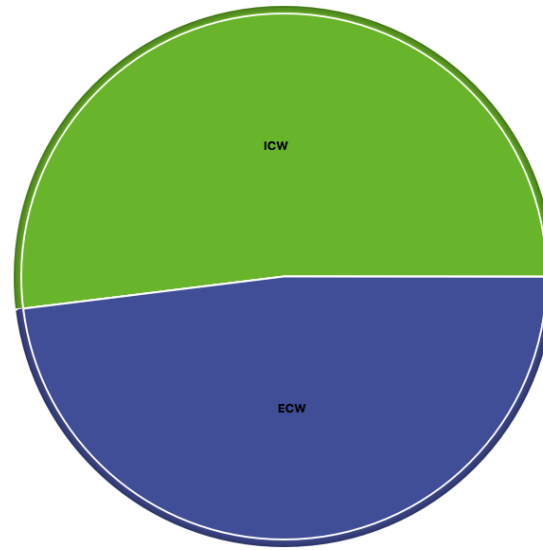
ECW

Body Composition History

	5/21/16	8/1/16
FFM	90.4	92.1
LST	85.1	86.7
TBW	67.3	68.7
SMM	34.7	38.3
Fat	29.6	31.9
LDM	23.2	23.5
BMC	5.4	5.4

Pounds

Date
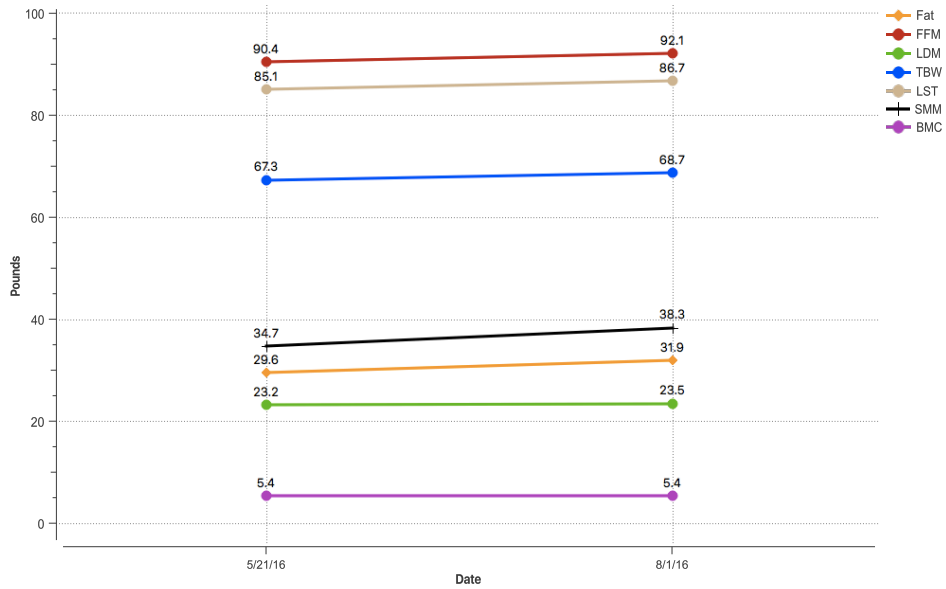
Phase Angle History
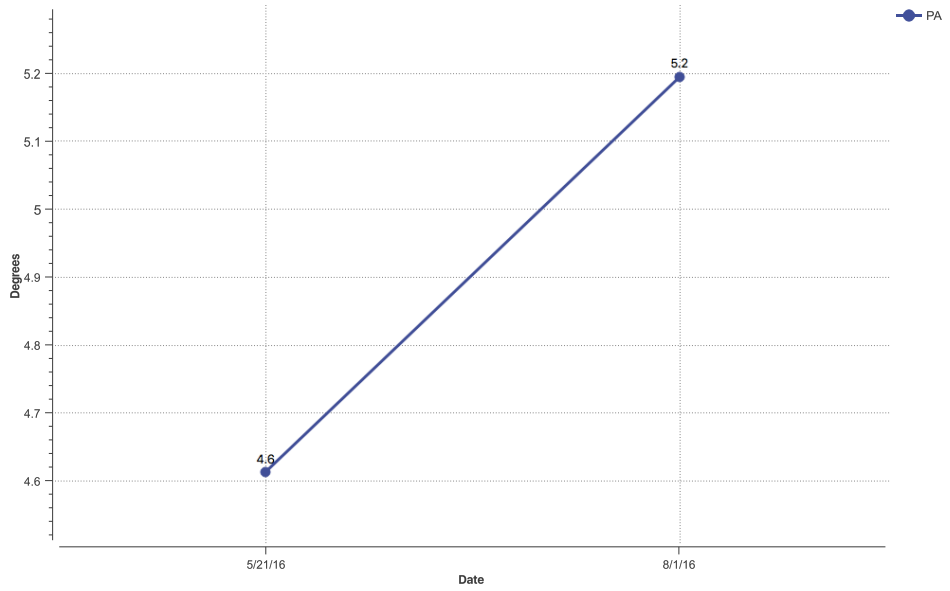
Estimated Body Composition
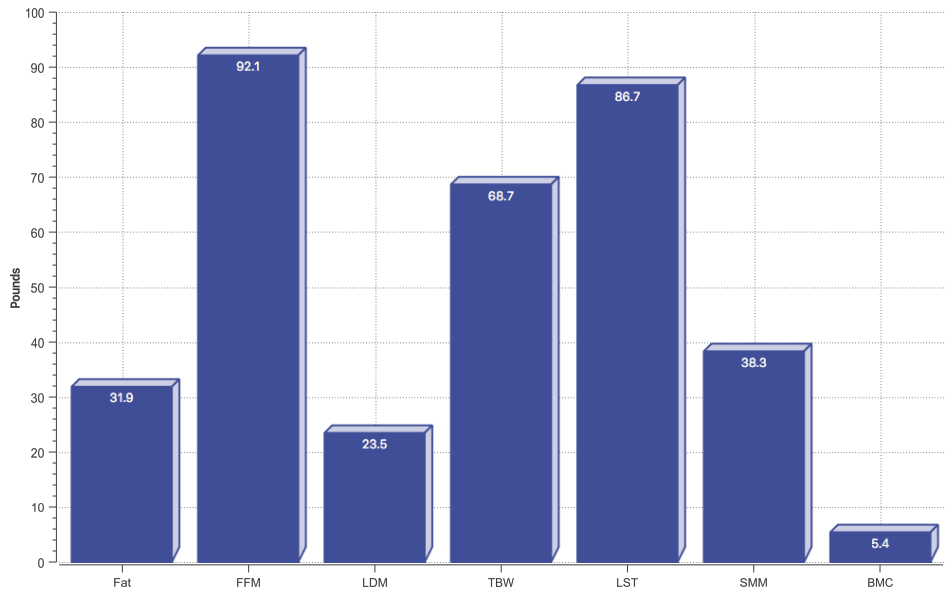
Estimated Fluids Compartments

Fluids History

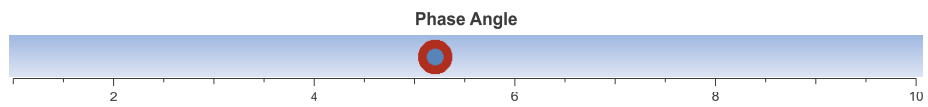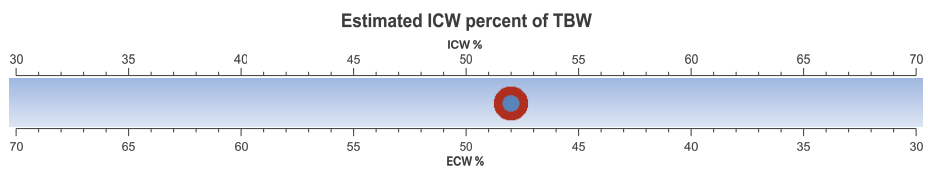|	TBW
	ICW
	ECW

67.3 → 68.7 (TBW)

34.4 → 35.7 (ICW)

32.8 → 33.0 (ECW)

Pounds

70

60

50

40

30

5/21/16   8/1/16

Date

Metabolic History

	BMR
	DEE

2,086.7 → 2,110.5 (DEE)

1,391.1 → 1,407.0 (BMR)

Calories

2,000

1,800

1,600

1,400

5/21/16   8/1/16

Date

Estimated ICW percent of TBW

ICW %

30   35   40   45   50   55   60   65   70

70   65   60   55   50   45   40   35   30

ECW %

Phase Angle

2   4   6   8   10

Fat Percentage

Under-Fat   Acceptable   Over-Fat   Obese

25.70%

0.00%   10.00%   20.00%   30.00%   40.00%   50.00%
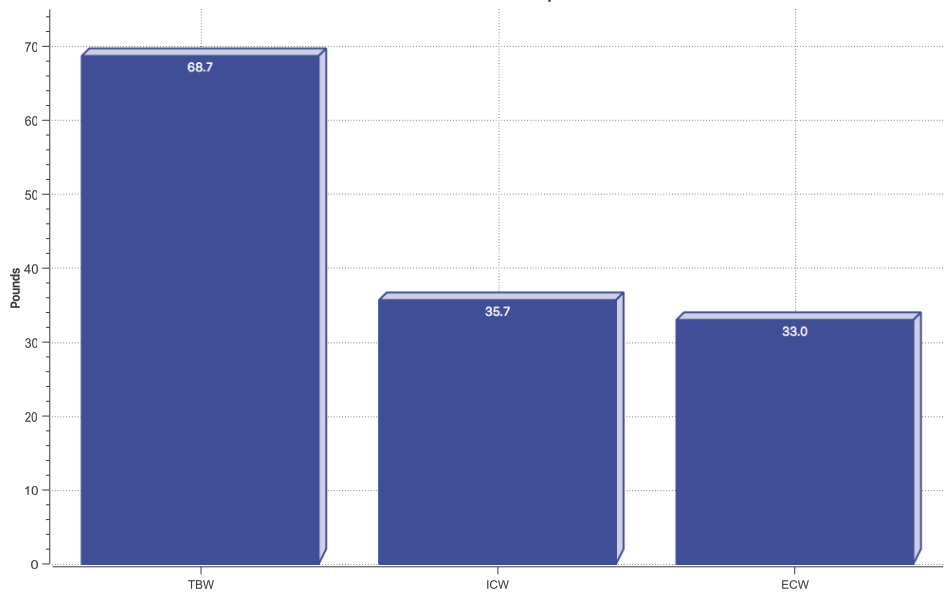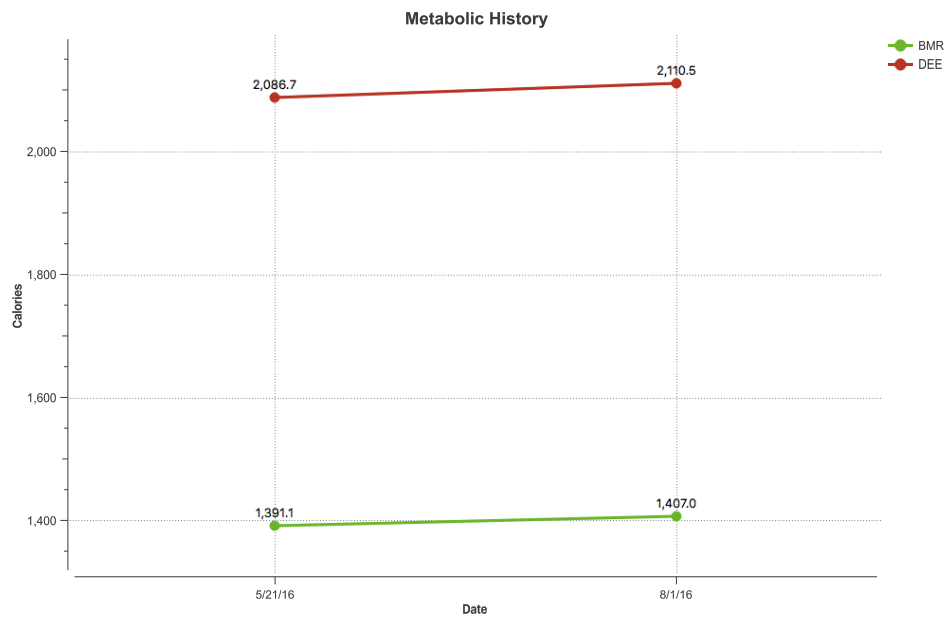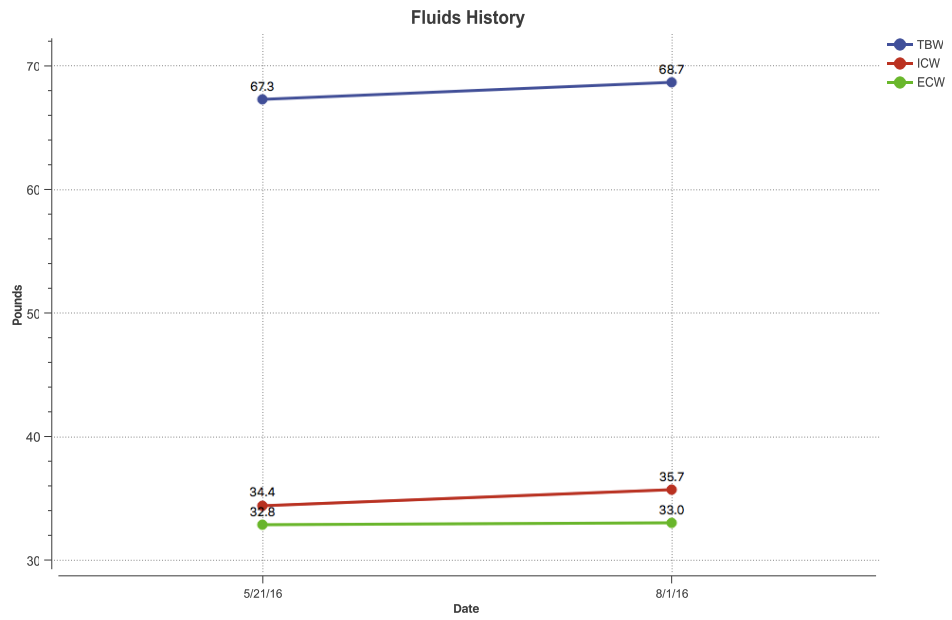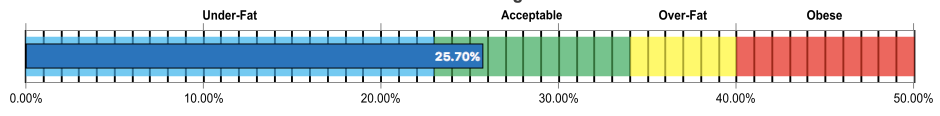
History

	5/21/16	8/1/16
Height	65.0	65.0
Weight	120.0	124.0
Age	55.0	56.0
Gender	Female	Female
R	595.0	583.0
Xc	48.0	53.0
Frame	Small	Small
Activity Level	Light	Light
equation_set	NHANES-III	NHANES-III
Target Weight	125.0	125.0
BMI	20.0	20.6
FMI	4.9	5.3
FFMI	15.0	15.3
PA	4.6	5.2
BMR	1391.1	1407.0
DEE	2086.7	2110.5
Fat	29.6	31.9
Fat % of Weight	24.6 %	25.7 %
FFM	90.4	92.1
FFM % of Weight	75.4 %	74.3 %
BMC	5.4	5.4
BMC % of Weight	4.5 %	4.4 %
BMC % of FFM	5.9 %	5.9 %
LST	85.1	86.7
LST % of Weight	70.9 %	69.9 %
LST % of FFM	94.1 %	94.1 %
SMM	34.7	38.3
SMM % of Weight	28.9 %	30.9 %
SMM % of FFM	38.3 %	41.6 %
LDM	23.2	23.5
LDM % of Weight	19.3 %	18.9 %
LDM % of FFM	25.6 %	25.5 %
TBW	67.3	68.7
TBW % of Weight	56.1 %	55.4 %
TBW % of FFM	74.4 %	74.5 %
ICW	34.4	35.7
ICW % of TBW	51.2 %	52.0 %
ECW	32.8	33.0
ECW % of TBW	48.8 %	48.0 %

Food & Fitness

 Work with your healthcare practitioner on strategies designed to help manage your total body weight, while building and maintaining muscle and bone density, and losing only unnecessary retained water and body fat.-->

Based on your body composition and activity level, your body would require approximately **2111** calories to keep your weight stable. Generally speaking, you must consume more calories than you burn if you want to gain weight. If you increase your daily activity, by adding strength or endurance training exercises for example, you will have to increase your daily food intake in excess of the number of calories burned by the added exercise.

Remember that the quality of the calories you eat also matters. For example, a candy bar and a piece of fruit may have the same number of calories, but the fruit contains more nutrients and fiber to help slow the absorption of its natural sugars.

Research shows that people who enjoy a variety of activities have a positive effect on several health markers. The following table offers a selection of lifestyle and fitness activities for your reference. It also includes an estimate of how many calories you would burn doing each activity for various time periods. Consider trying to work in an average of **89 Calories** of added activity each day.

Activity	Calories burned per				
	10 Minutes	20 Minutes	30 Minutes	60 Minutes	120 Minutes
bicycling, BMX	80	161	241	482	963
bicycling, mountain, general	80	161	241	482	963
bicycling, leisure, 9.4 mph	55	110	164	329	657
bicycling, 14-15.9 mph, racing or leisure, fast, vigorous effort	94	189	283	567	1,133
Elliptical trainer, moderate effort	47	94	142	283	567
health club exercise, conditioning classes	74	147	221	442	884
stretching, mild	22	43	65	130	261
yoga, Hatha	24	47	71	142	283
yoga, Power	38	76	113	227	453
ballet, modern, or jazz, general, rehearsal or class	47	94	142	283	567
aerobic, low impact	47	94	142	283	567
aerobic, high impact	69	138	207	414	827
vacuuming, general, moderate effort	31	62	93	187	374
walk/run, playing with animals, moderate effort, only active periods	38	76	113	227	453
shoveling snow, by hand, moderate effort	50	100	150	300	601
playing musical instruments, general	19	38	57	113	227
jog/walk combination (jogging component of less than 10 minutes) (Taylor Code 180)	57	113	170	340	680
jogging, general	66	132	198	397	793
Running, 4 mph (13 min/mile)	57	113	170	340	680
running, 5 mph (12 min/mile)	78	157	235	470	941
running, 6 mph (10 min/mile)	93	185	278	555	1,111
running, 7.5 mph (8 min/mile)	109	217	326	652	1,303
running, 8.6 mph (7 min/mile)	116	232	348	697	1,394
running, cross country	85	170	255	510	1,020
running, stairs, up	142	283	425	850	1,700
basketball, general	61	123	184	368	737
basketball, shooting baskets	42	85	127	255	510
bowling, indoor, bowling alley	36	72	108	215	431
golf, general	45	91	136	272	544
golf, walking, carrying clubs	41	81	122	244	487
hockey, ice, general	76	151	227	453	907
martial arts, different types, slower pace, novice performers, practice	50	100	150	300	601
rope jumping, slow pace, < 100 skips/min, 2 foot skip, rhythm bounce	83	166	249	499	997
soccer, casual, general (Taylor Code 540)	66	132	198	397	793
softball, practice	38	76	113	227	453
tennis, general	69	138	207	414	827
volleyball, non-competitive, 6 - 9 member team, general	28	57	85	170	340
walking for transportation, 2.8-3.2 mph, level, moderate pace, firm surface	33	66	99	198	397
backpacking, hiking or organized walking with a daypack	74	147	221	442	884
walking, household	19	38	57	113	227
walking, 3.5 mph, level, brisk, firm surface, walking for exercise	41	81	122	244	487
kayaking, moderate effort	47	94	142	283	567
swimming laps, freestyle, fast, vigorous effort	93	185	278	555	1,111
swimming, leisurely, not lap swimming, general	57	113	170	340	680
skiing, cross country, 4.0-4.9 mph, moderate speed and effort, general	85	170	255	510	1,020
skiing, downhill, alpine or snowboarding, moderate effort, general, active time only	50	100	150	300	601

	SAMPLE MEAL PLAN for 2200 CALORIES

The following sample meal plan meets or exceeds the dietary guidelines set by the American Heart Association, the American Cancer Society and the Surgeon General. The Health Enhanced Options provide suggestions that are high in fiber and phytonutrients, and contain no cholesterol. These options are also dairy–free, and often wheat–free and gluten–free, as well. If you have specific concerns, be sure to read ingredient labels.

BREAKFAST

0	Amaranth Flakes OR Bran flakes
0	Banana OR Peaches & Watermelon
1	Gluten Free Muffin OR English Muffin
2	Earth Balance(tm) OR Other margarine
1	Almond/Rice/Soy/Oat Milk OR Skim Milk
0	Grapefruit OR Banana
0	Herbal Tea OR Coffee

LUNCH

2	Engine 2 Ancient Grain Sprouted Tortilla OR Whole wheat bread
2	Lightlife ChikN Cutlet(tm) OR Sliced chicken
2	Vegenaise(tm) OR Mayonnaise
0	Jicama/Red Pepper/Cauliflower slices OR Carrot/Celery sticks
1	Peach OR Orange
5	Nilla(tm) wafers OR Vanilla wafers
0	Zevia(tm) OR Diet soft drink

DINNER

5	Baked Tofu Cutlet OR Broiled whitefish
1	Brown/Wild Rice OR Rice
1	Heaven Mills(tm) gluten free mini challah OR Dinner roll
2	Earth Balance(tm) OR Other margarine
1	Collard greens OR Spinach
1	Almond/Rice/Soy/Oat Milk OR Skim Milk
1	Tossed Salad and Light Dressing

SNACK

6	Glutino(tm) Pretzel Twists OR Popcorn
1	Pineapple Juice OR Orange juice
0	2 So Delicious Vanilla Sandwich Minis(tm) OR Lowfat vanilla ice cream

Higher Protein Foods

Foods that are higher in protein are used by the body to build tissue and muscle. All proteins, whether from plant or animal, are broken down by the body into amino acids, and then re-built into the proteins your body needs.

Proteins from plants will also contain fiber. Proteins from animals, birds, fish or insects will also contain cholesterol.

HEALTH ENHANCED OPTIONS (also contain fiber)	STANDARD MENU OPTIONS (also contain cholesterol)
1 Black bean burger	½ cup Chicken
1 cup Peas	½ cup Turkey
1 cup Vegetarian Chili	½ cup Beef, beef ribs, steak, hamburger
1 cup Snap peas or pea pods	½ cup Fish
1 cup Red beans	½ cup Shellfish
1 cup Tofu, edamame, or soybeans	½ cup Ham, Pig, pork, pork ribs, sausage
½ cup Hummus	½ cup Lamb
½ cup Garbanzo beans	½ cup Buffalo
1 cup Pea Soup	2 slices Lunchmeat, bologna
1 cup Quinoa	½ cup Cottage Cheese
½ cup Sprouts	1 Egg
½ cup Veggie Burger Crumbles	
1 cup Lentils or Mujadra	
1 Bean burrito	

Higher Carbohydrate Foods

Our bodies need higher carbohydrate foods for energy and metabolism. In their natural state, higher carbohydrate foods also tend to be high in fiber, low in fat, and contain no cholesterol.

Grains, fruits and vegetables are prominent in this category. Compared to all of the other food groups, fruits are our number one food source of vitamins, and vegetables are number one for minerals.

The carbohydrate category contains foods that are either high in fiber (i.e. broccoli, beans), or high in sugar (i.e. candy, donuts), or high in both fiber and sugar (watermelon, pineapple).

When the high carbohydrate food is still in its natural 'unrefined' state, it is typically also high in fiber, low in fat, and containing no cholesterol.

When the food contains 'refined sugar' or 'refined flour', it typically means fiber has been removed, usually in an effort to make the product's shelf life longer.

The HEALTH ENHANCED list will include options like berries, fruits, grains, and vegetables that are closer to their natural state, or are 'unrefined'. The fiber that is still naturally present in these 'unrefined' foods is very important for proper digestion, waste product transit time, blood sugar balance, and overall disease prevention. Therefore, the preventive nutritional approach would suggest food in its 'whole' and unrefined state whenever possible.

HEALTH ENHANCED OPTIONS (whole foods)	STANDARD MENU OPTIONS (refined foods)
1 slice whole grain bread	1 bread stick
½ whole grain Bagel	½ donut
1 cup whole grain cereal or mueslix	½ refined flour muffin
½ whole grain muffin	½ croissant
1 cup oatmeal	¼ cup cheese crackers
1 whole grain English Muffin	½ cup corn chips
½ cup 'high fiber' or 'bran' (unrefined) cereal	1 cup microwave popcorn
1 slice sprouted bread or Ezekial bread	½ cup 'refined' or presweetened cereals
3 cups air-popped popcorn	¼ cup stuffing
½ cup whole grain or quinoa noodles	1 dinner roll
½ cup brown rice	
½ cup corn	
1 corn cob	
1 cup squash	
1 small baked potato	

Higher Fat Foods

Humans need dietary fats for insulation, warmth, and healthy nerve conduction. An adequate amount of fat is also required to be able to absorb vitamins A, D, E, and K.

There are basically five different types of dietary fats: Essential, monounsaturated, polyunsaturated, saturated, and trans fats. Compared to the Standard American Diet intake, the World Health Organization recommends higher essential fats (like omega 3s), sufficient monounsaturated and polyunsaturated fats, lower saturated fat, and no trans fat (hydrogenated oils). The foods on the HEALTH ENHANCED list of choices contain no cholesterol.

(Please note that animal and poultry foods are high in fat, but they are also considered protein foods. For this reason, you will find them listed on the Higher PROTEIN Foods List, on the STANDARD MENU List.)

HEALTH ENHANCED OPTIONS	STANDARD MENU OPTIONS
2 TB non-dairy salad dressing	1 TB of mayonnaise
2 TB of chia seeds	1 TB of butter, ghee, lard, shortening or margarine
2 TB of hempseeds	1 TB of coconut oil
2 TB of ground flax seeds	1 TB of corn, safflower, sunflower oil
1 handful Walnuts	2 TB Cream
½ Avocado	¼ cup cottage cheese
¼ cup Coconut	1 TB cream cheese
1 TB Earth Balance margarine	1 slice or 3 cubes cheese
1 TB of Nayonnaise	2 TB Sour cream
2 Olives	1 TB Ranch-style dressing
1 TB Olive Oil	½ cup Yogurt
2 TB Sesame seeds	½ cup pudding
2 TB tahini sauce	
½ cup non-dairy pudding	
1 handful Almonds	
1 handful Peanuts, Cashews, or Pecans	
2 TB peanut butter	
2 TB almond butter	
2 TB cashew butter	

Calcium-Rich Foods

Strong bones and healthy teeth require a symphony of nutritional building blocks, like magnesium, calcium, phosphorous, boron and vitamin D.

While the Standard American Diet is heavy in dairy products, other cultures with healthy teeth and bones eat a variety of 'beans and greens' combinations that provide the necessary building blocks. The choices in the HEALTH ENHANCED list are rich in calcium, magnesium and other building blocks, without the cholesterol or saturated fat found in dairy products.

HEALTH ENHANCED OPTIONS	STANDARD MENU OPTIONS
1 cup Broccoli	½ cup yogurt
1 cup Bok choy	½ cup cottage cheese
1 cup Calcium enriched orange juice	½ cup frozen yogurt
1 cup Raisin bran cereals	1 cup milk
½ cup tofu	½ cup ice cream
1 cup vanilla or chocolate soy milk	½ cup buttermilk
1 cup vanilla or chocolate almond milk	1 slice cheese
1 handful of Almonds	3 cubes cheese
1 cup Collard Greens	
½ cup Black-eyed peas	
1 cup Kale	
1 cup Turnip or Mustard Greens	
1 handful Figs	
¼ cup Parsley, Basil, or Oregano	
½ cup Beans or Lentils	
¼ cup Cilantro or Chives	
1 handful Sesame seeds	
2 TB Tahini sesame butter	
1 handful Pumpkin Seeds	

Snack Foods

Most food plans call for one to three servings of snacks per day. It is important to choose wisely, looking for snacks that are both healthy and tasty. Since there really is no such thing as an 'empty calorie', it is a good idea to be mindful what is coming along with each calorie.

For example, some snack calories come with added sodium, artificial flavoring and colors, or no natural fiber left to help balance the snack's blood sugar spike (and subsequent crash). Other snack calories, like whole fruits and vegetables, come with vitamins, minerals, fiber, and phytonutrients.

If you are considering snacks that are not whole foods, look for 'fruit drinks' that are 100% fruit juice, and feel free to add water to dilute the sugar content - especially if the juice is 'from concentrate'. Read labels on packaged foods, as many 'fruit snacks' and 'fruit pastries' contain little to no actual fruit.

HEALTH ENHANCED OPTIONS	STANDARD MENU OPTIONS
½ cup of any fresh or fresh-frozen fruit (apple, banana, kiwi, peach, pear, starfruit, pineapple, mango, melon, etc.)	½ cup fruit cocktail
1 cup tomato soup	½ cup canned fruit
1 cup rice crackers	½ cup canned vegetables
¼ cup dried banana chips, raisins, cranberries, dates, figs	½ cup crackers
1 handful walnuts, pecans, hazelnuts, filberts, peanuts, or cashews	½ cup yogurt
1 handful soynuts	½ cup cottage cheese
1 handful pumpkin or sunflower seeds	1 slice cheese
2 TB veggie cream cheese	2 TB ranch-style dipping dressing
1 cup vegetable soup	1 cup of canned soup
1 cup of any fresh or frozen berries (strawberries, blueberries, lingonberries, raspberries, blackberries, marionberries, etc.)	½ cup fruit juice, from concentrate
1 plant-based protein bar	1 protein bar
2 TB dipping hummus	
2 TB dipping sesame tahini	
1 piece sprouted tortilla	
1 piece whole grain flatbread	
½ cup frozen peas or edamame	
½ cup whole grain crackers	
1 slice sprouted bread	
2 TB almond, hazelnut, peanut, or cashew butter	
1 cup of any fresh vegetable (tomato, celery, carrot, jicama, romaine, spinach, yam, sweet potato, etc.)	
½ cup fresh fruit juice, NOT from concentrate	
1 cup fresh vegetable juice	

Glossary of Terms

The terms below, as well as the graphical representation at the right, will help describe the general breakdown of the composition of the body.

Height - in inches (in) or centimeters (cm)

Weight - in pounds (lbs) or kilograms (kg)

Resistance - the opposition to the flow of an electrical current. Higher TBW and LDM yield a lower Resistance, and higher Fat and dehydration yield a higher Resistance.

Reactance - measures the body's opposition to changes in the flow of an electrical current. Reactance is related to the capacitance of the cell membranes, and reflects integrity, function, and composition.

Phase Angle (PA) - PA reflects the relative contributions of fluid (resistance), and cellular membranes (capacitive reactive). It is calculated as the arc-tangent of Reactance over resistance, measured in degrees. Typical Phase Angles (NHANES human data) range between 4-9.

Fat - provides insulation, warmth, and energy storage, and is necessary for the absorption of many vitamins.

Fat Free Mass (FFM) - is also called Lean Body Mass, and is everything in your body, except Fat.

Lean Dry Mass (LDM) - is what is left after subtracting all of the water from your Fat Free Mass.

Total Body Water (TBW) - is all of the water throughout your body, both inside and outside of your cells.

Intra-Cellular Water (ICW) - represents the amount of water inside your cells.

Extra-Cellular Water (ECW) - represents the amount of water outside of your cells.

Bone Mineral Content (BMC) - Bones are dynamic organs that include cells, blood vessels, collagen and mineral deposits. BMC is only an estimate of the minerals in the bones and does not represent the total weight of the skeleton. It is part of Fat-Free Mass.

Total Body Weight				
Fat	Lean Dry Mass		Total Body Water	
	Bone Mineral Content	Non-BMC LDM	Intra-Cellular Water	Extra-Cellular Water
		Lean Soft Tissue		
		Skeletal Muscle Mass	Non-SMM LST	

Lean Soft Tissue (LST) - In the same way that LDM is the result of removing all water from Fat-Free Mass, Lean Soft Tissue is the result of subtracting Bone Mineral Content from Fat-Free mass. This includes your organs, muscles, connective and supportive tissues, as well as all of Total Body Water.

Skeletal Muscle Mass (SMM) - SMM is the muscles responsible for posture and movement.

Basal Metabolic Rate (BMR) - The caloric energy required to sustain life in a sedentary state for 24 hours.

Daily Energy Expenditure (DEE) - DEE adjusts the BMR valued based on the selected activity level. The caloric energy required to sustain life, plus daily activities.

Body Mass Index (BMI) - BMI is derived by dividing total weight (kg) by height (m), squared. BMI is a general measure typically used to determine if someone is overweight, but knowing actual body composition is much more accurate.

Fat Mass Index (FMI) - FMI relates fat mass to height in the same way that BMI relates total weight to height. Because it takes into account only the fat mass, it is a superior indicator of obesity compared to BMI.

Fat Free Mass Index (FFMI) - FFMI relates fat-free mass to height in the same way that FMI does to fat. Fat + FFM = Weight, FMI + FFMI = BMI.

References

"About BMI for Adults." Centers for Disease Control and Prevention.
http://www.cdc.gov/healthyweight/assessing/bmi/adult_BMI/index.html

Accuracy of Bioelectrical Impedance Analysis in Estimation of Extracellular Space in Healthy Subjects and in Fluid Retention States.
Giuseppe Sergi, et. al.
Annals of Nutrition and Metabolism (1994) 38, 158-165

Bioelectrical Impedance Analysis (BIA) New Indications of Use for RJL Systems BC 4.0 Body Composition Software
RJL Systems
2014

Body composition estimates from NHANES-III bioelectrical impedance data.
WC Chumlea, SS Guo, et. al.
International Journal of Obesity (2002) 26, 1596-1609

Body fat reference curves for children
McCarthy HD, et al.
International Journal of Obesity. 2006;30:598-602

Development of bioelectrical impedance analysis prediction equations for body composition with the use of a multicomponent model for use in epidemiologic surveys.
Shumei S Sun, et. al.
American Journal of Clinical Nutrition (2003) 77, 331-40

Differences in resting metabolic rate between paraplegic and able-bodied subjects are explained by differences in body composition.
AC Buchholz, et al.
Am J Clin Nutr. 2003 Feb;77(2):371-8.

Fundamentals of physics : extended, with modern physics
David Halliday; Robert Resnick; Jearl Walker
New York [etc.] : John Wiley & Sons, cop. 1993 (4th Ed.)

Healthy percentage body fat ranges: an approach for developing guidelines based on body mass index
Gallagher D, et al.
AJCN. 2000;72:694-701

Physical Characteristics

Recommended Dietary Allowances, 10th Edition.
National Academy Press 1989-1999
ISBN: 0-309-04633-5
Online: http://books.nap.edu/catalog/1349.html

Therapy: changing dietary concepts.
Hamwi GJ.
Diabetes Mellitus: Diagnosis and Treatment 1964(1):73-78

Total-body skeletal muscle mass: estimation by a new dual-energy X-ray absorptiometry method
Kim J, et al.
AJCN. 2002;76:378-83