

Table 1. Study Group

Sex	Male
Age	45
Weight (kg)	70
Height (m)	1.77
PA Value	1
Calories intake per day	2301.942

Table 2. Calories Exchange Table

	<i>kcal/ gram</i>
Sugar	4
Carbohydrates	4
Protein	4
Fat	9
Saturated Fat	9

Table 3. Daily Intake Recommendations

<i>Recommendations</i>	<i>Lower bound</i>	<i>Upper bound</i>
Calories intake (kcal)	2201.942	2301.942
Fibers (g)	30	50
Fats (g)	51.154267	89.519967
Saturated Fat (g)	17.903993	23.01942
Carbohydrates (g)		149.62623
Proteins (g)	56	105
Sugar (g)		28.774275
Sodium (mg)	1500	2300
Calcium (mg)	800	2500
Iron (mg)	6	45
Potassium (mg)	3500	4700
Vitamin A (µg)	625	3000
Vitamin D (µg)	10	100

Table 4. Data on Food Prices and Nutritional Values

*Data was collected as of March 16, 2023

*All prices were collected from Walmart.ca

*All nutrition facts were collected from Walmart.ca & Nutritionix.com

		Prices	Price Proportions	Prices per Portion	Nutrition Facts	Nutrition Proportions	Calories(kcal)	Fat(g)	Saturated Fat(g)	Sodium(mg)	Carbohydrates(g)	Fiber(g)	Sugar(g)	Protien(g)	Vitamin A(µg)	Vitamin D(µg)	Calcium(mg)	Potassium(mg)	Iron(mg)
Fruits	Apple	\$5.45/kg	5.5	\$0.99	per piece (182 g)	1.0	95	0.3	0.1	1.8	25	4.4	19	0.5	0	0	11	194.7	0.2
	Banana	\$1.72/kg	8.5	\$0.20	per piece (118 g)	1.0	105	0.4	0.1	1.2	27	3.1	14	1.3	0	0	5.9	422.4	0.3
	Melon	\$5.97/melon	8.0	\$0.75	per piece	8.0	57.625	0.225	0.0625	28.75	14.5	1.25	13	0.8625	0	0	9.625	364.8	0.275
	Mango	\$.87/mango	2.0	\$0.44	per piece	2.0	101	0.65	0.15	1.7	25	2.7	23	1.4	0	0	18.5	282.25	0.25
Dairy	Milk	1.45/L	4.0	\$0.36	per (1/4) 250 ml	1.0	90	0	0	125	13	0	13	9	90	8	375	0	0
	Yogurt	\$7.28/pack of 16	16.0	\$0.46	per piece (100 g)	1.0	40	0	0	60	6	0	4	4	50	1	125	175	0.1
	Cheese	\$4.79/pack 750 g	10.0	\$0.48	per 125 g	1.7	60	1.5	0.9	174	4.2	0	4.2	8.4	10.8	0	112.5	0	0.12
Carbs.	Bread	3.97/pack 600 g	8.0	\$0.50	per 2 slices 75 g	1.0	190	3.5	0.5	270	33	4	3	8	0	0	75	200	2
	Rice	\$2.37/kg	22.2	\$0.11	per 45g	1.0	160	0	0	0	37	0	0	3	0	0	0	0	0
	Potatoes	\$1.99/kg	20.0	\$0.10	per 100 g	2.0	46.5	0.05	0	5	10.5	1.1	0.6	1.25	0	0	7.5	267.5	0.55
Protein	Chicken	\$15.48/chicken 1.5 kg	10.0	\$1.54	per chicken (1509 g)	10.0	321.4	23.3	6.7	104.1	0.14	0	0	25.8	0	0	15.1	295.76	2.1
	Fish	\$6.97/pack 908 g	7.3	\$0.96	per 125g of pack	1.0	90	2	1	240	0	0	0	17	0	0	0	0	0
	Tofu	\$2.47/pack 454 g	5.3	\$0.46	per 1/5 (85 g) of pack	1.0	70	4	0.5	3	2	0	0	7	0	0	125	175	1
	Egg	\$9.18/pack of 30	30.0	\$0.31	per egg	1.0	70	5	1.5	65	1	0	0	6	100	0	25	0	1
	Pork	\$10.96/kg	10.0	\$1.10	per 100 g	1.0	238	14	4.9	57	0	0	0	26	0	0.9	20	341	1.1
	Shrimp	\$12.47/pack 600g	7.1	\$1.77	per 125g of pack	1.5	54.4	0.34	0.136	462.4	0	0	0	12.24	0	0	27.2	102	0.204
	Beef	\$19.78/kg	10.0	\$1.98	per 100 g	1.0	259	17	6.8	50	0	0	0	26	0	0.2	13	271	2.2
Vegetables	Avocado	5.97/pack of 5	10.0	\$0.60	per avocado	2.0	161	14.5	2.15	7	8.5	6.5	0.65	2	0	0	12	487.45	0.55
	Beans	8.80/kg	10.0	\$0.88	per 100 g	1.0	35	0.3	0.1	1.3	7.9	3.2	3.6	1.9	0	0	44	146	0.7
	Carrots	\$2.10/kg	10.0	\$0.21	per 100 g	1.0	35	0.2	0	58	8.2	3	3.5	0.8	0	0	30	235	0.3
	Broccoli	\$8.80/kg	10.0	\$0.88	per 100 g	1.0	35	0.4	0.1	41	7.2	3.3	1.4	2.4	0	0	40	293	0.7
Free Foods	Tea	9.97/pack of 216	216.0	\$0.05	per tea bag	1.0	0	0	0	0	1	0	0	0.1	0	0	0	0	0
	Chips	\$1.48/pack 200g	4.0	\$0.37	per 1/4 (50 g) of pack	1.0	280	19	1.5	290	26	2	0	3	0	0	10	600	0.75
	Pretzels	\$2.97/pack 400g	8.0	\$0.37	per 1/8 (50 g) of pack	1.0	200	1	0	700	42	2	1	5	0	0	25	0	2
	Bacon	\$5.97/pack 375g	5.5	\$1.08	per 2 sclices 68g	1.0	290	29	11	480	40	0	0	7	0	0	0	100	0.2

*Grayed out cells are missing values imputed to 0 (zero)

Decisions

		Breakfast	Lunch	Dinner
Fruits	Apple	0	0	0
	Banana	0	0	0
	Melon	0	0	0
	Mango	0	0	0
Dairy	Milk	0	0	1
	Yogurt	1	-0	0
	Cheese	0	0	0
Carbs.	Bread	0	1	0
	Rice	0	0	0
	Potatoes	0	0.847987	0.152013
Protein	Chicken	0.684522	0	0
	Fish	0	0	0
	Tofu	0.152013	0	0.847987
	Egg	0	0	1
	Pork	1	0	0
	Shrimp	0	0	0
	Beef	0.5	0	0
Vegetables	Avocado	0	1	0
	Beans	0	0.566255	0
	Carrots	0	0	1
	Broccoli	0	0	1
Free Foods	Tea	0	0	0
	Chips	0	1	0
	Pretzels	0	0.585759	0
	Bacon	0.126378	0	0

Objective

Cost per Meal	3.80456	2.263392	2.165772
Total Cost	8.233724		

Constraints (Set 1)

		LHS					RHS
Lower Bounds	Calories (LB)	674.796022	807.402044	296.427688	1778.625754	>=	2201.942
	Fat (LB)	42.722385	37.798034	8.999548	89.519967	>=	51.154267
	Saturated Fat (LB)	14.352464	4.206625	2.023993	20.583083	>=	17.903993
	Sodium (LB)	274.376233	982.007203	292.304027	1548.687463	>=	1500
	Carbohydrates (LB)	11.454978	105.47914	32.692113	149.62623	>=	0
	Fiber (LB)	0	16.416317	6.467215	22.883532	>=	30
	Sugar (LB)	4	6.783067	17.991208	28.774275	>=	0
	Protein (LB)	62.609416	18.064661	24.325924	105	>=	56
	Vit A (LB)	50	0	190	240	>=	625
	Vit D (LB)	2	-0	8	10	>=	10
	Calcium (LB)	180.837947	142.919068	577.13844	900.895455	>=	800
	Potassium (LB)	893.194452	1596.959606	717.061228	3207.215287	>=	3500
	Iron (LB)	3.914786	5.334288	2.931594	12.180668	>=	6
Upper Bounds	Calories (UB)	674.796022	807.402044	296.427688	1778.625754	<=	2301.942
	Fat (UB)	42.722385	37.798034	8.999548	89.519967	<=	89.519967
	Saturated Fat (UB)	14.352464	4.206625	2.023993	20.583083	<=	23.01942
	Sodium (UB)	274.376233	982.007203	292.304027	1548.687463	<=	2300
	Carbohydrates (UB)	11.454978	105.47914	32.692113	149.62623	<=	149.62623
	Fiber (UB)	0	16.416317	6.467215	22.883532	<=	50
	Sugar (UB)	4	6.783067	17.991208	28.774275	<=	28.774275
	Protein (UB)	62.609416	18.064661	24.325924	105	<=	105
	Vit A (UB)	50	0	190	240	<=	3000
	Vit D (UB)	2	-0	8	10	<=	100
	Calcium (UB)	180.837947	142.919068	577.13844	900.895455	<=	2500
	Potassium (UB)	893.194452	1596.959606	717.061228	3207.215287	<=	4700
	Iron (UB)	3.914786	5.334288	2.931594	12.180668	<=	45

Constarints (Set 2)

		LHS		RHS
Variety	Apple	0	<=	1
	Banana	0	<=	1
	Melon	0	<=	1
	Mango	0	<=	1
	Milk	1	<=	1
	Yogurt	1	<=	1
	Cheese	0	<=	1
	Bread	1	<=	1
	Rice	0	<=	1
	Potatoes	1	<=	1
	Chicken	0.684522	<=	1
	Fish	0	<=	1
	Tofu	1	<=	1
	Egg	1	<=	1
	Pork	1	<=	1
	Shrimp	0	<=	1
	Beef	0.5	<=	1
	Avocado	1	<=	1
	Beans	0.566255	<=	1
	Carrots	1	<=	1
	Broccoli	1	<=	1
	Tea	0	<=	1
	Chips	1	<=	1
	Pretzels	0.585759	<=	1
	Bacon	0.126378	<=	1
	Fruits	0	>=	1
	Dairy	2	>=	1
	Carbs.	2	>=	1
	Protein	4.184522	>=	1
	Vegetables	3.566255	>=	1
	Free Foods	1.712137	>=	1
	Breakfast (LB)	3.462914	>=	3
	Lunch (LB)	5	>=	3
	Dinner (LB)	5	>=	3
	Breakfast (UB)	3.462914	<=	5
	Lunch (UB)	5	<=	5
	Dinner (UB)	5	<=	5

Microsoft Excel 16.71 Feasibility Report

Worksheet: [project_update_2.xlsx]Model 1

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Constraints Which Make the Problem Infeasible

Cell	Name	Cell Value	Formula	Status	Slack
\$F\$45	Vit A (LB) LHS	240	\$F\$45>=\$H\$45	Violated	-385
\$K\$16	Egg LHS	1	\$K\$16<=\$M\$16	Binding	0