PART 4

THE RESEARCH KITCHEN

CHAPTER 18

DOCUMENTATION, RECORD KEEPING, AND RECIPES

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THE NEED FOR DOCUMENTATION

Extensive records accrue during the course of each human feeding study. These records, which specify the many details of the study, should be compiled to form a permanent file that is organized in a unique manner suitable to each research center. Because the permanent study file must contain documentation that could answer post-publication inquiry into study methods and procedures, it is essential to keep all records until the data have been published and sufficient time has passed for colleagues to challenge the results. Investigators and dietitians thus should make every effort to leave records that can be clearly interpreted in their absence. Personnel may be employed at several facilities over the course of their careers, but study records remain at the facility of origin to be used by others. In practical application, permanent files are typically kept as historical documentation long after the study has been published. Data for addressing new research questions can often be taken from archived permanent study files if pertinent detailed records have been maintained.

The forms in this chapter have been used by research dietitians to develop and implement diet studies. They are intended to serve as starting points for the development of specialized forms tailored to the unique needs of each research center. (Also see Chapter 3, ''Computer Applications in Controlled Diet Studies,'' for a discussion of computer-generated forms.)

THE PERMANENT STUDY FILE

A permanent study file (or notebook) should be prepared for each study and maintained in the dietary offices. The file should be readily available to the principal investigator and the study coordinator, but access may be limited to most others if it contains confidential information about individual subjects. The following are examples of the types of information included in such files:

- **Study protocol:** The protocol should be provided by the principal investigator. Any modifications or updates should be documented.
- **Diet summary:** The summary describes the general characteristics and purpose of the diet, the methods used to adjust energy intake, supplements used, test meal procedures, and other pertinent information.
- **Nutrient summary:** This section includes a summary of the calculated nutrient content of the diet, preferably with a comparison to the Recommended Dietary Allowances (RDA). The calculated nutrient content is based on the reference calorie level of the diet unless otherwise specified by the principal investigator. Nutrient summaries for the daily intakes and for the entire menu cycle for each

dietary treatment are also included. The name and version of the database used to calculate nutrient content of menus should be identified.

- **Menus:** A detailed master menu is included that shows at least one energy level, and preferably all the levels, used for the entire menu cycle. A record of foods and brand names purchased for the study, quantity specifications of food used (to facilitate future studies), and any changes made in the diets during the study should also be included. A summary evaluation of the diets (along with recommendations for possible changes that would improve management, palatability, etc) is useful in planning future studies.
- **Diet composites for chemical analysis:** This section should describe all diet composites, the corresponding menus, and the dates the composites were prepared, with reference to location of more complete listings. The procedure for making the composites and information on analyzed and calculated nutrient content should be included. If validation phase composites were assayed, the study file should include the analytical results, the menu, and details of modifications made for the actual study meals.
- **Interview forms and procedures:** The dietary interview forms for each participant and all dietary instructions provided to the participants should be placed in the file.
- **Body weight records:** The method used to determine participant energy needs should be described. Weight and energy intake graphs or computer printouts for individual participants should be included. (See also Chapter 17, ''Energy Needs and Weight Maintenance in Controlled Feeding Studies.'') The protocol for weighing the participants, including the type and brand of scale used, state of dress, etc, should be described. If dietary energy changes were made to maintain constant body weight, the criteria for doing so should be listed.
- **Prestudy food record and study intake records:** The location of food intake records and participant daily intake summaries should be referenced. The specific version of the nutrient database should be documented.
- **Emergency meals:** Copies of menus for ''emergency meals'' used for weather or other emergencies as well as food records associated with participants' emergency travel (eg, a death in the family) should be described.
- **Recipes:** All recipes used in the study should be included.
- **Suppliers:** The names and addresses of suppliers of any special food products (eg, casein, gluten flour) should be listed.

Forms for Planning, Producing, and Delivering Research Diets

Properly designed forms can be enormously helpful in managing the logistical sequence of research diet studies. A form for planning diet studies is shown in Exhibit 18-1; with it, the investigator and dietitian can document agreed-upon features of the study protocol.

Forms are used to plan workloads and ensure accurate completion of kitchen tasks:

- Exhibits 18-2 and 18-3 are examples of work schedules for four foodservice workers: two who work an early shift, two who work a late shift.
- Exhibit 18-4 is a checklist to be initialed by the foodservice workers who complete daily housekeeping tasks.
- Exhibit 18-5 is an example of a production sheet that is provided at each workstation. For each participant, food items are weighed or portioned as indicated. In many studies foods are weighed in proportion to participants' calorie levels. The ''kitchen menu'' shown in Chapter 13, ''Delivering Research Diets,'' is another example of a production sheet that displays gram amounts of foods by calorie level.
- Exhibit 18-6 is a form used in conjunction with a quality control program to avoid errors created by use of a wrong recipe ingredient or improper label. Prior to weighing ingredients for a recipe, the foodservice worker has a coworker check and initial that the proper ingredients are used. Labeling steps are similarly double-checked. This allows mistakes to be traced so that errors are corrected and employees can be retrained if necessary.

Many types of quality control forms are also needed to ensure correct delivery of meals to participants:

- Exhibit 18-7 is an example of a menu given to study participants. At some facilities such menus are pinned to a common bulletin board to announce the day's meals. At the facility supplying this form, it is also used as a tray check. In a metabolic ward setting, the study participant, together with the foodservice worker who delivers the meal tray, checks each item on the tray against the listed food items to ensure complete delivery of foods.
- Exhibit 18-8 is a form used in the quality assurance/quality control process to avoid errors of omission or duplication of food items served to study participants. The form serves as a check that the tray or take-out container is complete. In the facility supplying this form, several foodservice workers assemble the trays, checking off the items as they are added to the tray.
- Exhibit 18-9 is an example of a form that is given to participants with their take-out meals. The form serves several purposes: (1) It is a checklist for take-out meals. Dietary employees check the appropriate slot on the form as the corresponding food item is put into the take-out container. (2) This form identifies which foods the participants are to eat at each meal. (3) At the bottom of the form, pertinent information for participants is provided. In this case instructions for reheating meals are included. Food safety messages or emergency telephone numbers might also be included.

Finally, a daily record form like the one shown in Exhibit 18-10 is used to document participants' deviations from

EXHIBIT 18-1

Diet Formulation Questionnaire

The purpose of this questionnaire is to ensure that:

- The diet is nutritionally adequate.
- No extraneous constituents interfere with the outcome of the study.
- The diet design fulfills the purpose of the study.

I. OVERVIEW OF PROTOCOL

A. Nutrient(s) under investigation (include target levels or requirements):

_____

_____

_____

B. Subjects:

	Number	Age Range	Weight (% ideal)	Other Characteristics
Males				
Females				

C. Design of the Study:

Number of feeding periods: _____
Length of feeding periods: _____
Length of depletion phase: _____
Length of repletion phase: _____

Prestudy periods? _____ No _____ Yes (specify) _____

Follow-up studies? _____ No _____ Yes (specify) _____

D. Type of Diet (check):

_____ Formula diet
_____ Conventional foods (whole)
_____ Conventional foods (pureed)
_____ Combination of formula and conventional foods

E. Comments:

_____

_____

II. NUTRIENT SPECIFICATIONS

	Amount	or	Other Information
A. Energy			
1. Intake goal			
a. kcal/day			
b. kcal/kg/day			
2. Basis for requirement (check)			
_____ BMR × 1.5			
_____ BEE × 1.5			
_____ Additional allowance for vigorous activity			
_____ kcal/kg body weight			
_____ Prestudy food records			
B. Protein			
1. Intake goal			
a. g N/kg body weight			
b. % kcal			
2. Source(s) (check)			
a. Formula diet			
_____ Egg albumin			
_____ Na/Ca casein			
_____ Soy protein			
_____ Amino acids			

(*continued*)

EXHIBIT 18-1

Continued

	Amount	or	Other Information
b. Conventional food diet			
_____ Animal			
_____ Plant			
_____ Textured protein			
_____ Low-protein products			
C. Carbohydrate			
1. Intake goal			
a. g/day	_____		
b. % kcal	_____		
2. Distribution			
a. % complex	_____		
b. % simple	_____		
3. Source			
a. Complex	_____		
b. Simple	_____		
D. Fat			
1. Intake goal			
a. g/day	_____		
b. % kcal	_____		
2. Fatty acid specifications			
a. P:S ratio	_____		
b. ___% polys, ___% monos, ___% sats	_____		
3. Type of fat to use (check)			
_____ Corn oil			
_____ Coconut oil			
_____ Cottonseed oil			
_____ Olive oil			
_____ Peanut oil			
_____ Safflower oil			
_____ Vegetable shortening			
_____ Other			
E. Fiber			
1. Intake goal			
a. g/day	_____		
2. Source			
_____ Alpha cellulose			
_____ Methyl cellulose			
_____ Raffinose			
_____ Bran			
_____ Pectin			
_____ Other			
F. Vitamins (daily intake goal)			
1. Daily intake goal			
A	_____		
B-1 (thiamin)	_____		
B-2 (riboflavin)	_____		
B-3 (niacin)	_____		
B-6	_____		
B-12	_____		
Folate	_____		
C	_____		
D	_____		
E	_____		
Other	_____		
2. Any specific chemical forms required?			

(*continued*)

EXHIBIT 18-1

Continued

Amount or Other Information

G. Minerals and Electrolytes
1. Daily intake goal
   - Calcium _____
   - Phosphorus _____
   - Magnesium _____
   - Iron _____
   - Zinc _____
   - Sodium _____
   - Potassium _____
   - Chloride _____
   - Iodine _____
   - Selenium _____
   - Other _____
2. Any specific chemical salts required?

H. Supplements
1. Reason for use:
2. Needed components and amounts:
3. Type(s) and source(s):

III. MEAL, MENU, AND PROTOCOL SPECIFICATIONS

A. Meal Schedule
1. No. of meals per day _____
2. No. of hr between each meal _____
3. No. of snacks per day _____
4. Preferred hours for snacks and meals

B. Water Allowance
1. Minimum intake goal (ml/day) _____
2. Source (check)
   - _____ Tap
   - _____ Bottled
   - _____ Distilled
3. Measurements of intake (check)
   - _____ No (ad lib)
   - _____ Yes (specify): _____

C. Beverage Allowance
1. Total caffeinated beverages (c/day) _____
2. Coffee
   a. Amount (c/day) _____
   b. Type (check)
      - _____ Decaffeinated
      - _____ Brewed
      - _____ Filtered
      - _____ Instant
3. Tea
   a. Amount (c/day) _____

(*continued*)

EXHIBIT 18-1

Continued

	Amount	or	Other Information
b. Type (check)			
_____ Decaffeinated			
_____ Regular			
_____ Instant			
_____ Bottled			
4. Soft drinks	_____		
a. Amount (12-oz cans/day)	_____		
b. Type (check)			
_____ Regular			
_____ Sugar-free			
c. Flavor (check)			
_____ Cola			
_____ Seltzer			
_____ Orange			
_____ Lemon			
_____ Root beer			
_____ Other			

D. Other Allowances and Restrictions

1. Indicate whether allowed (check)
   - _____ Non-nutritive sweeteners
   - _____ Chewing gum, regular
   - _____ Chewing gum, sugar-free
   - _____ Flavorings
   - _____ Candy
   - _____ Fruit juice
   - _____ Canned fruit
   - _____ Bread
   - _____ Other
2. Any specific items that would interfere with the study?

E. Biomarkers

1. Type (check)
   - _____ PABA
   - _____ PEG
   - _____ Fecal markers
2. Other comments

F. Load Tests

1. Purpose
2. Type
3. Frequency
4. Dose
5. Intake adjustments needed

G. Comments

EXHIBIT 18-2

Duty Schedule for Two Employees Assigned to First Shift

HOURS: 6 AM to 2:40 PM

6:00	Check temperatures of refrigerators and freezers.
6:05	Unlock all cabinets, refrigerators, and freezers.
7:00	Prepare outpatients' breakfast. Start weighing for lunch. Clean dining room tables.
7:30	Serve breakfast to outpatients.
7:45	BREAKFAST BREAK for first employee (Person A).
8:00	Collect breakfast trays from dining room. Weigh leftover foods and record in book. Clean dining room tables. General duties.[1]
8:30	Start breakfast preparation for inpatients.
9:00	Deliver trays to patients' rooms. BREAKFAST BREAK for second employee (Person B). Take dirty dishes to main kitchen.
9:30	Collect breakfast trays. Continue lunch preparation. Pack dinner take-outs and snacks for outpatients. General duties.
11:00	COFFEE BREAK.
11:15	General duties.
11:45	Set up trays for outpatients. Clean dining room tables.
12:00	Serve lunch.
12:15	Set up trays for inpatients.
12:30	Serve lunch. Collect trays from dining room. Clean dining room tables.
12:35	LUNCH BREAK. Take dirty dishes to main kitchen.
1:05	Collect trays from patients' rooms. Weigh ingredients for custard. Prepare dressing for next day. Transfer frozen entrees to refrigerator for next day. General duties.
2:40	END OF SHIFT.

[1]General duties: Wash, dry, and put away dishes. Refill distilled water. Record items that need to be ordered. Weigh coffee, margarine, sugar, etc. Trim and wrap meats. Do advance preparation as needed. Help others as needed. Record freezer, refrigerator temperatures. Perform other assigned duties.

study protocol. The form is filled in each morning by study participants. Use of medications and other deviations are noted in a computer log of ''daily comments'' that is maintained by the study coordinator. A scientist who obtains unusual laboratory results on a given date may, for example, ask the study coordinator whether medications were taken that week; this question can be readily answered by checking the notes on the daily record form.

RECIPES FOR RESEARCH DIETS

The general format for research diet recipes should be standardized for each research kitchen. Recipe elements should include:

- Menu name for the finished product.
- Database food code number for each ingredient.

EXHIBIT 18-3

Duty Schedule for Two Employees Assigned to Second Shift

HOURS: 10:20 AM to 7:00 PM.

10:20	Weigh liquids for lunch and dinner. Help Person A if preparation for the day is not finished. General duties.[1]
12:00	LUNCH BREAK.
12:30	Help Person A collect trays from patients' rooms. Weigh for next day.
1:00	Pick up supplies from downstairs. Put away supplies. Continue weighing for next day. Help Person A prepare dressing. General duties.
2:00	COFFEE BREAK.
2:15	Bake custard in main kitchen. Arrange the trays in refrigerator for next day's meals. General duties.
4:00	DINNER BREAK for third employee (Person C).
4:30	Set up trays for inpatients.
5:00	Serve inpatients' dinner.
5:30	Set up trays for outpatients. Clean dining room tables.
6:00	Serve outpatients' dinner. DINNER BREAK for fourth employee (Person D).
6:30	Collect trays from dining room. Clean dining room tables. General duties.
7:00	END OF SHIFT.

[1]General duties: Wash, dry, and put away dishes. Refill distilled water. Record items that need to be ordered. Weigh coffee, margarine, sugar, etc. Trim and wrap meats. Do advance preparation as needed. Help others as needed. Record freezer, refrigerator temperatures. Perform other assigned duties.

- Full description of each ingredient.
- Weight (in metric units) or volume of each ingredient.
- Specific directions for preparations, cooking, packaging, and storage.
- Oven or stove temperatures.
- Specific utensils and equipment needed.
- Yield.
- Nutrient content by database calculation.
- Nutrient content by chemical assay (if available).

For the sample recipes provided in this chapter, nutrient content calculations were performed using USDA databases, print version *Agricultural Handbook 456* or electronic version SR-11 *(Nutrient Database for Standard Reference)*, Agricultural Research Service, US Department of Agriculture, Riverdale, MD 20737, or Nutritionist III (First Databank, The Hearst Corporation, San Bruno, CA 94066).

The recipes appearing in this section were generously shared by research dietitians from across the country. Although the recipes have been checked for accuracy, users are encouraged to test them in their own facilities and to confirm nutrient calculations using their own databases.

Many of the recipes are for baked products because of their common use as vehicles for delivering dietary fats. Most are also appropriate for general research diets. Other recipes are for main dishes, low-sodium recipes, a low-protein recipe for fruit topping, and unit foods. Unit foods are baked goods that have the macronutrient composition of the overall research diet. They are used to increase calorie intake without altering the nutrient composition of the diet.

Quality checks for recipes that are used at the University of Iowa GCRC are listed here. (Information provided courtesy of Phyllis Stumbo, PhD, RD, and Cathy Chenard, MS, RD, University of Iowa Medical School, Iowa City, IA.) These ''checks'' are included in recipe directions to help spot any recipe preparation errors that may occur. The recipes in this section that include checks are Greg's Herb Butter, Greg's Low-sodium Vinegar and Oil Salad Dressing, and Shuli's Low-protein Fruit Topping.

EXHIBIT 18-4

Checklist for End of Shift

Persons B and C:	Init.	Init.	Init.	Init.	Init.	Init.	Init.
Stock paper cups, disposable containers, etc, in cabinet							
Replace all kitchen towels							
Rinse out dishwasher basket							
Replenish condiments in dining room							
Clean and sanitize: (1) can opener							
(2) range and oven							
(3) scales							
(4) dining room tables, chairs, carts							
(5) sinks							
(6) microwave							
(7) cabinets: outside/inside							
Person A:	**Init.**	**Init.**	**Init.**	**Init.**	**Init.**	**Init.**	**Init.**
Throw out leftover foods: baked potato, roast beef, etc							
Throw out old produce							
Clean toasters							
Throw out outdated dairy products, egg, milk, whip cream, yogurt							
Clean and sanitize: (1) warmer							
(2) counters							
(3) range and oven							
(4) dining room tables, chairs, microwave							
(5) chopping boards							
Produce sink: clean/sanitize; let water and garbage disposal run for 5 minutes							
Replenish condiments in dining room							

- After ingredients are combined but before cooking or baking, the actual weight of ingredients in the bowl or pan is compared with the ''theoretical'' weight (sum of ingredient weights). If they are very different, the recipe is discarded and prepared again. (See Shuli's Low-protein Fruit Topping.)
- After the recipe is prepared and all servings are weighed, the weight of leftover food is compared to the ''theoretical'' waste. (Theoretical waste = Recipe total weight – [Serving weight × Number of servings].) The actual waste is usually less than the theoretical waste because of spills and food adhering to utensils and containers. However, a large discrepancy may indicate that servings were weighed incorrectly or an incorrect number of servings was weighed. (See Shuli's Low-Protein Fruit Topping and Greg's Herb Butter.)
- When servings are prepared individually rather than in bulk, the finished product is reweighed and compared to

EXHIBIT 18-5

Production Sheet

Name: _____ Protocol: _____

Breakfast	
Cranberry juice	240 g
$MgSO_4.7H_2O$	1 g
Corn flakes	20 g
Scrambled eggs:	
Eggbeaters	19 g
Egg whites	122 g
Salt-free margarine	7 g
Salt-free bread, toast	52 g
Salt-free margarine	10 g
Jelly	1 pkg
Brewed coffee	1 cup
Mocha Mix	58 g
Distilled water	530 g
Sugar	1 pkg
Pepper	1 pkg

Lunch	
Sandwich:	
Salt-free bread	48 g
Salt-free margarine	7 g
Tuna salad	77 g
Lettuce	1 leaf
Tomato	1 slice
Applesauce	150 g
Pear nectar	130 g
Salt-free vanilla cookies	27 g
Distilled water	530 g

Dinner	
Beef casserole	166 g
Salt-free margarine	6 g
Salt-free bread	15 g
Salt-free margarine	5 g
Peas	69 g
Pears	132 g
Brewed coffee	1 cup
Mocha Mix	11 g
Sugar	1 pkg
Distilled water	530 g
Pepper	1 pkg

the theoretical serving weight. (See Greg's Low-sodium Salad Dressing.)

- When a recipe requires cooking or baking (as with spaghetti noodles, spaghetti sauce, and cakes), the product weight is recorded before and after cooking, and then the actual cooked weight/raw weight ratio is compared with the value assumed in calculating the recipe's nutrient composition. If the two yields differ greatly, the serving weight is adjusted to reflect this. For example, it is difficult to boil spaghetti sauce to an identical weight each time it is prepared. When calculating the nutrient composition of spaghetti sauce, one may have assumed that the total cooked weight would be 1,000 g; but when it is prepared, the actual cooked weight might be 1,125 g. To account for the additional water in this batch of spaghetti sauce, one would adjust the serving weight by a factor of 1.125 (ie, 1,125 ÷ 1,000). Instead of serving 100 g of spaghetti sauce as originally planned, 112.5 g (ie, 100 × 1.125) would be served.

EXHIBIT 18-6

Quality Control Form for Verifying Accuracy of Recipe Ingredients and Food Labels

Recipe	Weighed by: Init/Date	Ingred. Checked by: Init/Date	Frozen Batter Labeled by: Init/Date (2 People)	Cooked by: Init/Date	Cooked Product Labeled by: Init/Date (2 People)
Crisco Cookies	DA 1/1/99	HM-1/1/99	FL-1/1/99 GS-1/1/99	DA-1/2/99	HM-1/2/99 BH-1/2/99

EXHIBIT 18-7

Menu

Name: _____ Protocol: _____

Breakfast

Cranberry juice
Corn flakes
Mocha Mix
Scrambled eggs
Salt-free toast
Margarine
Jelly
Brewed coffee
Sugar
Distilled water
Pepper

Lunch

Tuna sandwich on salt-free bread
Applesauce
Pear nectar
Salt-free vanilla cookies
Potato chips
Distilled water

Dinner

Beef casserole
Salt-free bread with salt-free margarine
Peas
Canned pear
Brewed coffee
Mocha Mix
Sugar
Distilled water

8 PM Snack

Saltine crackers with salt-free margarine
Salt-free vanilla cookies

EXHIBIT 18-8

Tray Check Form or Checklist[1]

SUBJECT: PROTOCOL:

Breakfast	**1/1**	**1/2**	**1/3**	**1/4**	**1/5**	**1/6**	**1/7**	**1/8**	**1/9**	**1/10**
Cranberry juice										
Corn flakes										
Mocha Mix										
Scrambled eggs										
Salt-free toast										
Salt-free margarine										
Jelly										
Brewed coffee										
Sugar										
Distilled water										
Pepper (1 pkt)										
Lunch										
Tuna sandwich										
Potato chips										
Applesauce										
Pear nectar										
Salt-free vanilla cookies										
Distilled water										
Dinner										
Casserole										
Salt-free bread/margarine										
Peas										
Canned pear										
Brewed coffee										
Sugar										
Mocha Mix										
Distilled water										
8 PM Snack										
Saltines/margarine										
Salt-free vanilla cookies										
Distilled water for next day										

[1]Tray checklists often display the amounts served. This aids in finding discrepancies (eg, 3 cookies vs 2, 150 g rice vs 100 g).

EXHIBIT 18-9

Checklists and Instructions for Take-out Meals

Fat20A	
Lunch:	
Turkey sandwich	
Chicken noodle soup	
Salad	
Dressing	
Apple juice	
Peaches	
Angel Food cake	
Dinner:	
Meatloaf/gravy	
Rice	
Broccoli	
Cranberry Juice	
Apple slices	
Salad	
Dressing	
Milk	
Snacks:	
Lemonade	
Graham crackers	
Applesauce	

Fat20B	
Lunch:	
Roast beef sandwich	
Canned pear	
Kit-Kat	
Hard cooked egg	
Grape juice	
Orange juice	
Milk	
Dinner:	
Chicken a la King	
Rice	
Zucchini	
Salad	
Dressing	
Canned pineapple	
Cranberry juice	
Snacks:	
Pound cake	
Canned peaches	
Milk	

Fat20C	
Lunch:	
Lentil casserole	
Rice	
Salad	
Dressing	
Parmesan cheese	
Graham crackers	
Hard cooked egg	
Corn	
Mandarin orange	
Peach nectar	
Dinner:	
Spaghetti	
Parmesan cheese	
Peas	
French bread	
Butter	
Milk	
Orange juice	
Snacks:	
Whole wheat bread	
Jelly	
Banana	
Apple juice	

USE OF DUOTHERM DISPOSABLES

1. Do not use ovenware on stove top, under broiler, in toaster oven, during oven preheat cycle, or with oven temperatures above 450°F.
2. For safety, always use potholders to remove plate after heating.
3. To heat plate:

Microwave

1. Pop lid to allow steam to escape.
2. Microwave on medium power until hot.

Conventional Oven

1. Remove lid.
2. Cover with foil.
3. Bake at 350°F for 20 minutes or until hot (add time for frozen dinners).

These plates do not need to be returned but can be reused.

EXHIBIT 18-10

Daily Record Form

NAME _____ SUBJECT NUMBER _____ DATE _____

Please provide the following information covering the past 24 hours.

HEALTH

Have you been sick or had medical treatment? Yes _____ No _____

If so, describe: _____

Have you taken any medication? Yes _____ No _____

Record the total amount taken (for the day) of the following:

Aspirin _____ Tylenol _____ Advil _____ Antacids _____

Other over-the-counter medicines: Name _____ Amount _____

Prescription medications: Name _____ Amount _____

DIET

Record anything you ate or drank that was not provided by the study:

_____

_____

Record the amounts of the following that you drank:

Diet Sodas _____ Regular Coffee _____ Decaf Coffee _____

Regular Tea _____ Decaf Tea _____

EXERCISE

Did you engage in any vigorous physical exercise? Yes _____ No _____

What type? _____ For how long? _____

FOR SMOKERS ONLY

Record the amount that you smoked:

Cigarettes _____ Cigars _____ Pipe _____

FOR WOMEN ONLY

Did you take hormones for birth control or hormone replacement therapy?

Yes _____ No _____

If so, what (name)? _____

Dosage _____

Recipe 1: Unit Cookie, Oatmeal

Courtesy of Irving Center for Clinical Research, Columbia University; Wahida Karmally, MS, RD, CDE, and Maliha Siddiqui, MS.

Comment: Recommended for studies of macronutrients. Unit foods are used to increase calorie levels while maintaining nutrient composition of the diet. This recipe produces an energy distribution of protein, 15%; carbohydrate, 55%; and fat, 30%.

Food Code	Ingredients	Weight (g)
561	Sugar, granulated	100.0
122	Olive oil	32.0
1889	Coconut oil (melt before weighing)	14.0
1871	Oatmeal, regular, raw	208.0
531	Nut, walnut, Persian/English, ground	20.0
66	Milk, nonfat, instant, dried	90.0
811	Cinnamon, ground	8.0
681	Baking powder	2.4
97	Egg, white	138.0
2041	Vanilla	12.0
	Total raw weight	624.40

Directions:

1. Preheat oven to 350°F.
2. Cream together sugar and oils.
3. Add dry oatmeal, ground nuts, and nonfat dried milk (do not reconstitute), cinnamon, and baking powder. Mix well.
4. Add egg white and vanilla. Mix well.
5. Weigh cookie dough to a raw weight of 31 g per cookie.
6. Bake on ungreased cookie sheet for 10 minutes. Be careful not to overbake.
7. Cool completely before freezing/storage.
   Yields 18 cookies, 31 g raw weight each.

Nutrient Analysis (by Nutritionist III). Nutrient analysis is based on raw weight.

Nutrients	Units	per 100 g
Food energy	kcal	346
Protein	g	13.3
Fat	g	11.5
Carbohydrate	g	48.4
Saturated fat	g	3.3
Polyunsaturated fat	g	2.6
Monounsaturated fat	g	5.1
Cholesterol	g	2.5
Calcium	mg	222
Phosphorus	mg	324
Potassium	mg	417
Sodium	mg	160

Recipe 2: Unit Muffin, Banana

Courtesy of Irving Center for Clinical Research, Columbia University; Wahida Karmally, MS, RD, CDE, and Maliha Siddiqui, MS.

Comment: Recommended for studies of macronutrients. Unit foods are used to increase calorie levels while maintaining nutrient composition of the diet. This recipe produces an energy distribution of protein, 15%; carbohydrate, 55%; and fat, 30%.

Food Code	Ingredients	Weight (g)
502	Wheat flour, all-purpose, enriched	35.0
561	Sugar, granulated	110.0
1611	Baking soda	2.0
822	Salt	2.0
811	Cinnamon, ground	8.0
814	Nutmeg, ground	2.0
531	Nut, walnut, Persian/English, ground	22.6
235	Banana, raw, pureed	140.0
122	Olive oil	30.0
1889	Coconut oil (melt before weighing)	14.0
2041	Vanilla	12.0
97	Egg, white	440.0
1871	Oatmeal, regular, raw	140.0
	Total raw weight	957.6

Directions:

1. Preheat oven to 375°F.
2. Combine flour, sugar, baking soda, salt, spices, ground nuts, pureed banana, oils, and vanilla.
3. In a separate bowl, beat egg whites with an electric beater until fluffy.
4. Stir oatmeal into flour mixture; fold in egg whites.
5. Weigh muffin mixture (46 g) into paper cups. Tare balance between each weighing.
6. Place muffin cups in tins and bake for 20 to 25 minutes until done.
7. Remove from tins. Cool completely before freezing/storage.
   Yields 20 muffins, 46 g raw weight each.

Nutrient Analysis: (by Nutritionist III). Nutrient analysis is based on raw weight.

Nutrients	Units	per 100 g
Food energy	kcal	208
Protein	g	8.1
Fat	g	7.1
Carbohydrate	g	29.2
Saturated fat	g	2.1
Polyunsaturated fat	g	1.6
Monounsaturated fat	g	3.1
Cholesterol	mg	0
Calcium	mg	25.1
Phosphorus	mg	90
Potassium	mg	196
Sodium	mg	215

Recipe 3: Unit Muffin, Applesauce

Courtesy of Irving Center for Clinical Research, Columbia University; Wahida Karmally, MS, RD, CDE, and Maliha Siddiqui, MS.

Comment: Recommended for studies of macronutrients. Unit foods are used to increase calorie levels while maintaining nutrient composition of the diet. This recipe produces an energy distribution of protein, 15%; carbohydrate, 55%; and fat, 30%.

Food Code	Ingredients	Weight (g)
502	Wheat flour, all-purpose, enriched	34.0
1611	Baking soda	2.0
822	Salt	2.0
811	Cinnamon, ground	8.0
814	Nutmeg, ground	2.0
561	Sugar, granular	110.0
1871	Oatmeal, regular, raw	140.0
531	Nut, walnut, Persian/English, ground	22.4
97	Egg, white	440.0
122	Olive oil	30.0
1889	Coconut oil (melt before weighing)	14.0
227	Applesauce, unsweetened	300.0
2041	Vanilla	12.0
	Total raw weight	1,116.4

Directions:

1. Preheat oven to 375°F.
2. Combine flour, baking soda, salt, spices, sugar, oatmeal, and ground nuts.
3. Beat whites and add to fats, applesauce, and vanilla. Stir until mixture is barely moist.
4. Add raw weight portion of batter (55 g) one at a time to paper cups, taring balance between additions.
5. Place cups in muffin tin and bake for 20 to 25 minutes or until done.
6. Cool thoroughly before wrapping for freezer/storage.
   Yields 19 or 20 muffins, 55 g raw weight each.

Nutrient Analysis: (by Nutritionist III). Nutrient analysis is based on raw weight.

Nutrients	Units	per 100 g
Food energy	kcal	178
Protein	g	6.9
Fat	g	6.1
Carbohydrate	g	25.0
Saturated fat	g	1.8
Polyunsaturated fat	g	1.4
Monounsaturated fat	g	2.6
Cholesterol	mg	0
Calcium	mg	21
Phosphorus	mg	76
Potassium	mg	138
Sodium	mg	184

Recipe 4: Shuli's Low-protein Fruit Topping

Courtesy of University of Iowa GCRC; Cathy Chenard, MS, RD, LD; and Phyllis Stumbo, PhD, RD, LD.

Comment: Recipe adapted from "Easy Crumb Topping" in Schuett VE, *Low Protein Cookery for Phenylketonuria*, 3rd ed (Madison, Wis: The University of Wisconsin Press; 1997). © 1997. Adapted by permission of the University of Wisconsin Press. This recipe is recommended for low-protein diets.

Food Code	Ingredients	Weight (g)
____[1]	Rusk, low protein, crushed fine	50
19334	Sugar, brown	30
02010	Cinnamon, ground	0.5
02021	Ginger, ground	0.5
02025	Nutmeg, ground	0.5
01001	Butter	40
	Total raw weight of ingredients	121.5
	Total weight, prepared recipe	119.0

[1] Manufacturer's data, Aproten Low Protein Rusks: Dietary Specialties, Inc (Rochester, NY).

Directions:

1. Weigh rusk crumbs, brown sugar, and spices into bowl. Stir.
2. Record weight of a ___ qt microwave-safe bowl: ___ g.
3. Weigh butter into bowl. Cover with plastic wrap. Microwave on high power until butter softens.
4. Add rusk crumbs/sugar/spice mixture to softened butter. Stir until well mixed.
5. Weigh bowl and topping. Calculate actual recipe weight as percent of theoretical recipe weight (should be about 100%):

$$\frac{\text{bowl + topping weight}}{} - \frac{\text{bowl weight (step 2)}}{} = \frac{\text{topping weight}}{}$$

$$\times\ 100 \div \frac{\text{topping weight}}{\text{theoretical weight prepared recipe}} = \_\_\_\ \%$$

6. Weigh into plastic bags or small container: _____g × _____ servings. Label and date.
7. Record waste: ___ g (theoretical waste about ___ g). Discard.
   Yields approximately 3 servings, 36 g each.

Note: Recipe may be frozen. Margarine or unsalted butter may be substituted for butter.
Suggested portion size: 24–48 g topping for 80 g canned fruit.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).

Nutrients	Units	per 100 g	per 24-g serving
Food energy	kcal	517	124
Protein	g	0.8	0.2
Fat	g	31.3	7.5
Carbohydrate	g	61.1	14.7
Saturated fat	g	19.4	4.7
Monounsaturated fat	g	9.0	2.2
Polyunsaturated fat	g	1.2	0.3
Cholesterol	mg	83	20
Calcium	mg	45	11
Phosphorus	mg	36	9
Sodium	mg	300	72
Potassium	mg	130	31

Recipe 5: Greg's Herb Butter

Courtesy of University of Iowa GCRC; Cathy Chenard, MS, RD, LD, Phyllis Stumbo, PhD, RD, LD.
Comment: Recommended for general use.

Food Code	Ingredients	Weight (g)
04136	Butter	200
02032	Pepper, white	2
02029	Parsley, dried	0.5
02020	Garlic powder	2
	Total raw weight	204.5

Directions:

1. Weigh butter into mixing bowl; cover with plastic wrap. Leave at room temperature for about 15 minutes to soften.
2. Weigh white pepper, dried parsley, and garlic powder into butter.
3. Stir until thoroughly blended or use hand mixer.
4. Weigh 5 g herb butter into plastic containers, or weigh herb butter onto preweighed slices of bread or rusk. Wrap in plastic wrap. If necessary, cut slice in half and fold buttered sides to the center so butter does not stick to plastic wrap. Prepare ____ servings.
5. Affix label and freeze.
6. Record waste: garlic butter ____ g (theoretical waste about ____ g).
   Yields 40 servings, 5 g each.

Notes: Herb toast is best when warmed in oven or microwave. Recipe can be frozen. Margarine or unsalted butter may be substituted for butter. Suggested portion: 5 g to 10 g.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference).

Nutrients	Units	per 100 g	per 5-g serving
Food energy	kcal	705	35
Protein	g	1.1	0.1
Fat	g	79.3	4.0
Carbohydrate	g	1.0	0.1
Saturated fat	g	49.4	2.5
Monounsaturated fat	g	22.9	1.1
Polyunsaturated fat	g	2.9	0.1
Cholesterol	mg	214	11
Calcium	mg	28	1
Phosphorus	mg	27	1
Sodium	mg	809	40
Potassium	mg	45	2

Recipe 6: Greg's Low-sodium Vinegar and Oil Salad Dressing

Courtesy of University of Iowa GCRC; Cathy Chenard, MS, RD, LD, Phyllis Stumbo, PhD, RD, LD.
Comment: Recommended for low-sodium diets.

Food Code	Ingredients	Weight (g)
04518	Corn oil	12.0
02407	Distilled vinegar	8.0
19335	Sugar, granulated	1.0
09153	Lemon juice	0.5
	Herb mixture #1 (see below)	0.1
	Herb mixture #2 (see below)	0.4
	Total raw weight	22.0
Herb Mixture #1		
02029	Parsley, dried	1.0
02023	Marjoram, dried	1.0
Herb Mixture #2		
02020	Garlic powder	2.0
02026	Onion powder	3.0

Directions, Herb Mixture 1 and 2:

1. Weigh ingredients into container; stir to mix well.
2. Cover, label, and date. Store in cupboard until needed.

Directions, Salad Dressing:

1. Tare scale with 1-oz plastic medicine cup.
2. Weigh ingredients into cup. Mix. Affix plastic lid.
3. Prepare _____ servings total at 22 g each.
4. Label and date each container.
5. Refrigerate. Shake before serving.
   Yields 1 serving.

Quality Control Check (before labeling):

1. Tare scale with an empty 1-oz medicine cup and lid.
2. Weigh each salad dressing container and compare the actual weight to the theoretical weight of the serving of salad dressing.
3. If actual and theoretical weights differ by more than 1 g, discard dressing and prepare a new serving.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference).

Nutrients	Units	per 100 g	per 22-g serving
Food energy	kcal	512	113
Protein	g	0.3	0.1
Fat	g	54.6	12.0
Carbohydrate	g	8.2	1.8
Saturated fat	g	6.9	1.5
Monounsaturated fat	g	13.2	2.9
Polyunsaturated fat	g	32.0	7.0
Cholesterol	mg	0	0
Calcium	mg	12	3
Phosphorus	mg	8	2
Sodium	mg	3	1
Potassium	mg	38	8

Recipe 7: Low-sodium Sugar Cookies

Courtesy of Brigham and Women's Hospital GCRC; Janis Swain, RD.
Comment: Recommended for use in low-sodium diets.

Food Code	Ingredients	Weight (g)
92300[1]	Sugar, granulated	100.0
04131	Margarine, salt-free, unspecified oil	230.0
20081	Wheat flour, white, all-purpose, enriched	270.0
	Total raw weight	600.0

[1]Code is from USDA *Agricultural Handbook 456.*

Directions:

1. Preheat oven to 350°F.
2. Cream margarine and sugar. Add the flour and mix well.
3. Roll dough into bread loaf shape in foil and refrigerate overnight.
4. Weigh dough in 20-g portions. Bake 350°F for approximately 20 minutes.
5. Cool, then wrap individually in foil and freeze.
   Yields approximately 29 cookies, 20 g raw weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).

Note: nutrient analysis is based on uncooked weight.

Nutrients	Units	per 100 g	per 20-g serving
Food energy	kcal	502	100
Protein	g	4.8	1.0
Fat	g	31.2	6.2
Carbohydrate	g	51.1	10.2
Calcium	mg	13	3
Magnesium	mg	10	2
Potassium	mg	58	12
Sodium	mg	2	0.4

Recipe 8: Sugar Cookies

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.
Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
20081	Wheat flour, white, all-purpose, enriched	313.0
71300	Baking powder	6.0
89630	Salt	5.0
02010	Cinnamon, ground	2.0
92300	Sugar	258.0
04559	Shortening, soybean (hydrogenated) and palm oils	106.0
01123	Egg, whole, fresh	50.0
01124	Egg, whites, fresh	50.0
02052[1]	Vanilla, imitation without alcohol	4.5
	Total raw weight	794.5

[1]Most of the alcohol in flavoring extracts evaporates during baking and thus does not contribute calories. For this reason, the code for vanilla without alcohol is often used to calculate nutrient content of a recipe even when flavoring extracts with alcohol are used.

Directions:

1. Preheat oven to 375°F.
2. Mix together flour, baking powder, salt, and cinnamon in mixing bowl.
3. In separate mixing bowl, beat together sugar and shortening. Gradually add whole egg, egg whites, and vanilla. Beat until well blended.
4. Stir in dry ingredients.
5. Refrigerate approximately 1 hour or until well chilled.
6. Drop raw, weighed portions of dough onto lightly greased baking sheet. (Weight of dough used depends on the individual's diet.) Flatten dough lightly with a fork dipped into water.

7. Bake cookies 8 minutes or just until slightly brown. After 4 minutes rotate baking sheet so cookies brown evenly.
8. Cool completely on rack before freezing/storage. Yields 15 cookies, 50 g raw weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).

Note: Nutrients in recipe based on raw weight.

Nutrients	Units	per 100 g
Food energy	kcal	402
Protein	g	5.5
Fat	g	14.4
Carbohydrate	g	63.1
Saturated fat	g	4.3
Polyunsaturated fat	g	2.1
Monounsaturated fat	g	7.1
Cholesterol	mg	26.8
Calcium	mg	88
Phosphorus	mg	73
Potassium	mg	173
Sodium	mg	348

Recipe 9: Banana Bread

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.

Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
04065	Margarine, corn oil	90.0
92300[1]	Sugar, granulated	160.0
01123	Eggs, whole, fresh	100.0
09040	Banana	245.0
20081	Wheat flour, white, all-purpose, enriched	250.0
71300[1]	Baking powder	12.5
	Total raw weight	857.5
	Total cooked weight	753.0

[1]Code is from USDA *Agricultural Handbook 456.*

Directions:

1. Preheat oven to 350°F.
2. Cream together margarine, sugar, and eggs. Mash bananas; add to creamed mixture.
3. Sift together flour and baking powder. Add to creamed banana mixture; beat until smooth.
4. Lightly spray an 8½ × 4½ inch Teflon loaf pan with vegetable oil. Pour batter into prepared pan. Bake 40 minutes.
5. Cool slightly before removing from pan.
6. Cool completely on rack before freezing/storage. Yields 15 slices, 50 g each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).

Note: Nutrient analysis is based on cooked weight (753.0 g) rather than uncooked weight (857.5 g). When actual weights differ from theoretical weights, the weight of the portion to be served is adjusted to reflect the actual weight of the product as described at the beginning of this chapter section; or nutrient analysis is modified based on actual weight.

Nutrients	Units	per 100 g
Food energy	kcal	340
Protein	g	5.5
Fat	g	11.4
Carbohydrate	g	54.9
Saturated fat	g	2.2
Polyunsaturated fat	g	3.2
Monounsaturated fat	g	5.2
Cholesterol	mg	56.4
Calcium	mg	122
Phosphorus	mg	95
Potassium	mg	189
Sodium	mg	297

Recipe 10: Pound Cake

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.

Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
01001	Butter	223.1
92300[1]	Sugar, granulated	425.0
01123	Eggs, whole, fresh	250.0
20081	Wheat flour, white, all-purpose, enriched	270.0
89630[1]	Salt	1.4
71300[1]	Baking powder	1.0
02022	Mace, ground	0.5
02025	Nutmeg, ground	1.1
02052	Vanilla, imitation without alcohol	5.5
——[2]	Brandy	16.5
	Total raw weight	1,194.1
	Total cooked weight	1,086.0

[1]Code is from USDA *Agricultural Handbook 456.*

[2]In-house value used; flavoring extracts may be substituted and code for vanilla used.

Directions:

1. Preheat oven to 325°F.
2. Cream together butter and sugar until light and fluffy. Add eggs in 4-portion increments and beat well after each addition.
3. In separate bowl, blend together flour, salt, baking powder, mace, and nutmeg. Add to batter mixture; mix well.

4. Add vanilla and brandy; blend thoroughly.
5. Lightly spray 9-inch Teflon loaf pan with vegetable spray. Pour batter into loaf pan.
6. Bake 45 minutes; then cover cake lightly with foil and bake 25 minutes more or until a toothpick inserted into the center of the cake comes out clean. Do not overbake.
7. Cool slightly before removing from pan.
8. Cool completely before freezing/storage.
   Yields 14 slices, 75 g cooked weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).
Note: Nutrient analysis is based on cooked weight (1,086 g) rather than uncooked weight (1,194.1 g). When actual weights differ from theoretical weights, the weight of the portion to be served is adjusted to reflect the actual weight of the product as described earlier in this chapter; or nutrient analysis is modified based on actual weight.

Nutrients	Units	per 100 g
Food energy	kcal	429
Protein	g	5.6
Fat	g	19.3
Carbohydrate	g	58.5
Saturated fat	g	11.2
Polyunsaturated fat	g	1.0
Monounsaturated fat	g	5.7
Cholesterol	mg	142.8
Calcium	mg	26
Phosphorus	mg	74
Potassium	mg	62
Sodium	mg	259

Recipe 11: Sponge Cake

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.
Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
01124	Egg white, fresh	180.0
92300[1]	Sugar, granulated	200.0
09216	Lemon/Orange peel, grated	2.0
01125	Egg yolk, fresh	90.0
14429	Boiling water	60.0
02052	Vanilla, imitation without alcohol	5.0
——[2]	Flour, cake	96.0
71300[1]	Baking powder	5.0
89630[1]	Salt	1.5
	Total raw weight	639.5
	Total cooked weight	525.6

[1]Code is from USDA *Agricultural Handbook 456.*
[2]In-house data.

Directions:

1. Preheat oven to 350°F.
2. Beat egg whites until stiff but not dry. Set aside.
3. Mix sugar and fruit peel together.
4. Beat egg yolks until very light. Add sugar/fruit peel mixture gradually.
5. Beat in boiling water. When mixture cools, add vanilla.
6. Sift together cake flour, baking powder, and salt. Add flour mixture to yolk mixture and stir until blended.
7. Fold in beaten egg whites.
8. Pour batter into clean 10-inch tube pan. Bake in lower third of oven for 45 minutes.
9. When cake is done, remove from oven and immediately reverse pan. Allow cake to cool upside down for 1½ hr or until cake drops from pan.
10. Cool completely on rack before freezing/storage.
    Yields 10 slices, 50 g cooked weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).
Note: Nutrient analysis is based on cooked weight (525.6 g) rather than uncooked weight (639.5 g). When actual weights differ from theoretical weights, the weight of the portion to be served is adjusted to reflect the actual weight of the product as described earlier in this chapter; or nutrient analysis is modified based on actual weight.

Nutrients	Units	per 100 g
Food energy	kcal	295
Protein	g	7.8
Fat	g	5.4
Carbohydrate	g	53.7
Saturated fat	g	1.6
Polyunsaturated fat	g	0.7
Monounsaturated fat	g	2.0
Cholesterol	mg	219.3
Calcium	mg	89
Phosphorus	mg	118
Potassium	mg	88
Sodium	mg	270

Recipe 12: Ginger Thins

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.
Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
04065	Margarine, corn oil	100.0
92290[1]	Sugar, brown	156.0
01125	Egg yolk, fresh	45.0
83390[1]	Molasses, light	60.0
20081	Wheat flour, white, all-purpose, enriched	265.0
18372	Baking soda	2.5
02011	Cloves, ground	1.0
02010	Cinnamon, ground	1.0
02021	Ginger, ground	1.0
	Total raw weight	631.5
	Total cooked weight	584.0

[1]Code is from USDA *Agricultural Handbook 456.*

Directions:

1. Preheat oven to 350°F.
2. Cream together margarine, brown sugar, egg yolk, and molasses.
3. Mix together in separate bowl, flour, baking soda, cloves, cinnamon, and ginger. Add to creamed mixture.
4. Refrigerate dough for approximately ½ hr for easy handling.
5. Shape dough into approximately 1-in balls and place on lightly greased cookie sheet. Press balls down with a fork. Be sure ''cookie form'' is uniform and attractive.
6. Bake for approximately 8 minutes.
7. Cool on cookie sheet.
   Yields 18 cookies, 30 g cooked weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).
Note: Nutrient analysis is based on cooked (584.0 g) rather than uncooked (631.5 g) weight. When actual weights differ from theoretical weights, the weight of the portion to be served is adjusted to reflect the actual weight of the product as described at the beginning of this chapter section; or nutrient analysis is modified based on actual weight.

Nutrients	Units	per 100 g
Food energy	kcal	443
Protein	g	6.2
Fat	g	16.7
Carbohydrate	g	67.7
Saturated fat	g	3.2
Polyunsaturated fat	g	4.6
Monounsaturated fat	g	7.6
Cholesterol	mg	98.7
Calcium	mg	78
Phosphorus	mg	103
Potassium	mg	269
Sodium	mg	178

Recipe 13: Oatmeal Cookies

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.
Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
92290[1]	Sugar, brown	145.0
92300[1]	Sugar, granular	200.0
04065	Margarine, corn oil	227.0
01125	Egg, yolk, fresh (about 8)	137.0
02052	Vanilla, imitation without alcohol	10.2
20081	Wheat flour, white, all-purpose, enriched	250.0
71300[1]	Baking powder	3.0
08120	Oatmeal, regular, dry	180.0
	Total wet weight	1,152.2
	Total cooked weight	1,064.0

[1]Code is from USDA *Agricultural Handbook 456.*

Directions:

1. Preheat oven to 350°F.
2. Cream together sugars and margarine.
3. Add egg yolks and vanilla.
4. Sift together flour and baking powder; add to the mixture. Mix well.
5. Add dry oatmeal and stir until blended.
6. Bake on ungreased cookie sheet for 10 minutes. Be careful not to overbake.
7. Cool completely on rack before freezing/storage.
   Yields 20 cookies, 50 g cooked weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).
Note: Nutrient analysis is based on cooked weight (1,064 g) rather than uncooked weight (1,152.2 g). When actual weights differ from theoretical weights, the weight of the portion to be served is adjusted to reflect the actual weight of the product as described earlier in this chapter; or nutrient analysis is modified based on actual weight.

Nutrients	Units	per 100 g
Food energy	kcal	473
Protein	g	7.5
Fat	g	22.4
Carbohydrate	g	61.6
Saturated fat	g	4.4
Polyunsaturated fat	g	6.2
Monounsaturated fat	g	10.1
Cholesterol	mg	164.7
Calcium	mg	66
Phosphorus	mg	180
Potassium	mg	153
Sodium	mg	240

Recipe 14: Basic Muffin Loaf

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.
Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
20081	Wheat flour, white, all-purpose, enriched	438.0
89630[1]	Salt	3.4
92300[1]	Sugar, granulated	48.0
02010	Cinnamon, ground	3.7
71300[1]	Baking powder	11.0
01086	Milk, skim with nonfat solids added, fluid	367.6
92290[1]	Sugar, brown	55.0
04518	Corn oil	54.4
01123	Eggs, whole, raw	100.0
	Total raw weight	1,081.1
	Total cooked weight	944.0

[1]Code is from USDA *Agricultural Handbook 456.*

Directions:

1. Preheat oven to 375°F.
2. Mix flour, salt, granulated sugar, cinnamon, and baking powder.
3. Heat milk (warm). Add brown sugar, oil, and beaten eggs.
4. Add milk mixture to the flour mixture and stir until barely moistened. Do not over mix.
5. Pour batter into a Teflon loaf pan (8½ × 4½).
6. Bake 40 minutes or until done.
   Yields 18 slices, 50 g cooked weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).
Note: Nutrient analysis is based on cooked weight (944.0 g) rather than uncooked weight (1,081.1 g). When actual weights differ from theoretical weights, the weight of the portion to be served is adjusted to reflect the actual weight of the product as described at the beginning of this chapter section; or nutrient analysis is modified based on actual weight.

Nutrients	Units	per 100 g
Food energy	kcal	294
Protein	g	7.5
Fat	g	7.4
Carbohydrate	g	48.8
Saturated fat	g	1.2
Polyunsaturated fat	g	3.7
Monounsaturated fat	g	1.9
Cholesterol	g	45.8
Calcium	mg	146
Phosphorus	mg	129
Potassium	mg	153
Sodium	mg	293

Recipe 15: Lemon Cookies

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.
Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
01001	Butter	50
04065	Margarine, corn oil	250
04518	Corn oil	150
92300[1]	Sugar	300
01123	Eggs, whole, fresh	75
01124	Egg whites, fresh	25
——[2]	Lemon extract	10
——[2]	Food color, yellow	3–4 drops
20081	Wheat flour, white, all-purpose, enriched	600
	Total raw weight	1,460.0

[1]Code is from USDA *Agricultural Handbook 456.*
[2]Values not available from USDA Nutrient Database for Standard Reference. In most cases the code for vanilla (02052) can be substituted for lemon extract. Because the amount of food color is small and the ingredient is not nutrient rich, this ingredient may be eliminated during the calculation, or a code for water can be substituted.

Directions:

1. Preheat oven to 350°F.
2. Cream together butter, margarine, and corn oil.
3. Add to above creamed mixture: sugar, whole eggs, egg whites, lemon extract, and yellow food color. Cream well.
4. Add flour and mix well.

5. Drop raw weight portion of dough (weight depending on individual's diet) onto an ungreased baking sheet. Press down with a fork; shape attractively.
6. Bake for 10 to 13 minutes.
7. Cool slightly before removing from baking sheet.
8. Cool completely on rack before freezing/storage.
Yields 45 cookies, 30 g raw weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).
Note: Nutrients in recipe based on raw weight.

Nutrients	Units	per 100 g
Food energy	kcal	478
Protein	g	5.3
Fat	g	27.8
Carbohydrate	g	52.2
Saturated fat	g	5.7
Polyunsaturated fat	g	10.5
Monounsaturated fat	g	10.2
Cholesterol	mg	29.3
Calcium	mg	32
Phosphorus	mg	62
Potassium	mg	131
Sodium	mg	206

Recipe 16: Chocolate Drop Cookies

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.
Comment: Recommended for diets to modify carbohydrate, protein, fat, and cholesterol.

Food Code	Ingredients	Weight (g)
01001	Butter	50.0
04065	Margarine, corn oil	115.0
04518	Corn oil	60.0
92300[1]	Sugar	300.0
01123	Eggs, whole, fresh	100.0
02052	Vanilla, imitation without alcohol	10.0
20081	Wheat flour, white, all-purpose, enriched	320.0
19165	Cocoa powder	60.0
18372	Baking soda	5.0
02010	Cinnamon, ground	3.0
89630	Salt	3.0
	Total raw weight	1,026.0

[1]Code is from USDA *Agricultural Handbook 456.*

Directions:

1. Preheat oven to 350°F.
2. Cream together butter, margarine, oil, and sugar. Stir in eggs and vanilla. Beat until light and fluffy.
3. In a separate bowl, mix flour, cocoa, baking soda, cinnamon, and salt. Stir into creamed mixture; blend thoroughly.
4. Drop batter in weighed portions (depending on the individual's diet) onto an ungreased baking sheet.
5. Bake for approximately 10 minutes.
6. Cool slightly before removing from baking sheet.
7. Cool completely on rack before freezing/storage.
Yields 30 cookies, 30 g raw weight each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).
Note: Nutrients in recipe based on raw weight.

Nutrients	Units	per 100 g
Food energy	kcal	450
Protein	g	5.4
Fat	g	23.4
Carbohydrate	g	55.0
Saturated fat	g	5.1
Polyunsaturated fat	g	6.5
Monounsaturated fat	g	7.3
Cholesterol	mg	52.1
Calcium	mg	51
Phosphorus	mg	104
Potassium	mg	242
Sodium	mg	282

Recipe 17: East Indian Cauliflower

Courtesy of Stanford University Medical Center GCRC; Patricia Schaaf, MS, RD.
Comment: Recommended for carbohydrate and lipids studies.

Food Code	Ingredients	Weight (g)
04518	Corn oil	15.0
02024	Mustard seeds, black	3.5
02014	Cumin seeds	1.3
——[1]	Asafoetida (Hing)	0.6
02043	Turmeric powder	1.0
11329	Green chili peppers, hot	7.0
89630	Salt	3.0
11135	Cauliflower, fresh	185.0
11529	Tomato, fresh, chopped	135.0
	Total raw weight	351.4[2]

[1]In-house data; not available from USDA *Nutrient Database for Standard Reference.*
[2]Added water (30 g, step 4 of directions) dissipates as steam and is therefore not included in the total raw weight.

Directions:

1. Heat vegetable oil in pan.
2. Add black mustard seeds and cumin seeds and heat until seeds pop.
3. Add asafoetida (Hing), turmeric, freshly chopped green chili peppers, and salt. Stir. Heat well.
4. Stir in fresh pared cauliflower florets and 30 g water.
5. Steam until cauliflower is just tender (do not overcook).
6. Add chopped tomato.
7. Stir gently to combine.
Yields 4 servings, 85 g each.

Nutrient Analysis: (by USDA Nutrient Database for Standard Reference except as noted).
Note: Nutrients in recipe based on raw weight. Added water (30 g) is assumed to dissipate as steam.

Nutrients	Units	per 100 g
Food energy	kcal	66
Protein	g	1.7
Fat	g	4.9
Carbohydrate	g	5.2
Saturated fat	g	0.6
Polyunsaturated fat	g	2.7
Monounsaturated fat	g	1.3
Cholesterol	mg	0
Calcium	mg	27
Phosphorus	mg	45
Potassium	mg	297
Sodium	mg	366

Recipe 18: Low-salt Salisbury Steak

Courtesy of University of North Carolina GCRC; Marjorie G. Busby, MPH, RD, LDN.
Comment: Recommended for low-salt diets and general research diets.

Food Code	Ingredients	Weight (g)
4938	Ground beef, lean (see below)	75.0
633	Onion, chopped fine	3.4
37	Tomato catsup, low sodium	10.0
818	Pepper, black	0.005
	Total raw weight	88.405

Directions:

1. To match this code, beef is ground to specifications at the feeding facility. (Top round of beef is trimmed to remove most visible fat, then ground.)
2. Mix all ingredients well; make into a patty. Handle as little as possible.
3. Spray skillet with vegetable spray; ''fry'' until done.
   Yields 1 serving.

Nutrient Analysis: (by Nutritionist III).
Note: Nutrient analysis is based on uncooked weight.

Nutrients	Units	per 100 g	per 88.4 g serving
Food energy	kcal	123	109
Protein	g	19	17
Fat	g	3.6	3.2
Carbohydrate	g	1.8	1.6
Potassium	mg	372	329
Sodium	mg	112	99

Recipe 19: Low-salt Beef Gravy

Courtesy of University of North Carolina GCRC; Marjorie G. Busby, MPH, RD, LDN.
Comment: Recommended for low-salt and low-fat research diets.

Food Code	Ingredients	Weight (g)
5048	Broth, instant, low-sodium	15.0
1821	Water, boiling	550
503	Wheat flour, all-purpose, enriched	50.0
818	Pepper, black	0.005
	Total raw weight	615.0

Directions:

1. Dissolve beef broth in boiling water.
2. Stir sifted flour into about ⅓ cup of beef broth; blend thoroughly.
3. Add remainder of broth; blend in blender. Add pepper.
4. Place mixture in glass container; microwave 4 to 4½ minutes or until mixture boils, stirring several times.
5. Stir until smooth; weigh 30-g portions into medicine cups; label, date and freeze.
6. To use, place frozen ''cube'' in microwave for 1½ minutes.
   Yields approximately 20 servings, 30 g each.

Nutrient Analysis: (by Nutritionist III).
Note: Nutrient analysis is based on uncooked weight.

Nutrients	Units	per 100 g	per 30-g serving
Food energy	kcal	37	11
Protein	g	1.0	0.3
Fat	g	0.3	0.1
Carbohydrate	g	7.4	2.2
Sodium	mg	9	3
Potassium	mg	9	3

Recipe 20: Baked Chicken Breast

Courtesy of University of North Carolina GCRC; Marjorie G. Busby, MPH, RD, LDN.
Comment: Recommended for general research diets.

Food Code	Ingredients	Weight (g)
4946	Chicken breast, deboned and skinned	90
822	Salt	0.25
818	Pepper	0.005
817	Parsley	0.05
816	Paprika	0.25
	Total raw weight	90.55

Directions:

1. Thaw chicken; flatten.
2. Place chicken on plastic wrap.
3. Sprinkle seasonings over chicken; wrap chicken loosely.
4. Place chicken in microwavable dish; cut 2 small slits in plastic wrap.
5. Microwave for 3 minutes, turn and microwave for 2 minutes more; serve.
   Yields 1 serving.

Nutrient Analysis: (by Nutritionist III).
Note: Nutrient analysis is based on uncooked weight.

Nutrients	Units	per 100 g	per 90-g serving
Food energy	kcal	194	175
Protein	g	29.4	26.5
Fat	g	8	7
Carbohydrate	g	0.2	0.2
Sodium	mg	177	159
Potassium	mg	252	227

Recipe 21: Lemon Baked Chicken

Courtesy of University of North Carolina GCRC; Marjorie G. Busby, MPH, RD, LDN.
Comment: Recommended for general research diets.

Food Code	Ingredients	Weight (g)
4946	Chicken breast, deboned and skinned	90
263	Lemon juice	15
822	Salt	0.25
818	Pepper	0.005
817	Parsley	0.05
813	Garlic powder	0.25
	Total raw weight	105.55

Directions:

1. Thaw chicken, flatten.
2. Place chicken on plastic wrap.
3. Sprinkle lemon juice and seasonings over chicken; wrap chicken loosely.
4. Place chicken in microwavable dish; cut 2 small slits in plastic wrap.
5. Microwave for 3 minutes, turn and microwave for 2 minutes more; serve.
   Yields 1 serving.

Nutrient Analysis: (by Nutritionist III).
Note: Nutrient analysis is based on uncooked weight.

Nutrients	Units	per 100 g	per 105-g serving
Food energy	kcal	170	178
Protein	g	25.2	26.5
Fat	g	6.6	6.9
Carbohydrate	g	1.1	1.2
Sodium	mg	154	162
Potassium	mg	228	239

Recipe 22: Macaroni and Cheese

Courtesy of University of North Carolina GCRC; Marjorie G. Busby, MPH, RD, LDN.
Comment: Recommended for general research diets.

Food Code	Ingredients	Weight (g)
2872[1]	Macaroni noodles, cooked	42.0
115	Margarine, hard, pat	7.0
503	Wheat flour, all-purpose, enriched	5.0
50	Milk, whole	120.0
3	Cheddar cheese, grated	45.0
350	Bread crumbs, whole wheat	8.0
818	Black pepper	0.005
	Total raw weight	285.0

[1]The food code used for nutrient analysis is for raw macaroni; 42 g of dry macaroni noodles (see directions) is expected to yield a cooked weight of approximately 100 g.

Directions:

1. Bring 2 cups of distilled water to a boil on high heat. Add 42 g of dry macaroni noodles to water. Cook on medium high heat for 15 minutes. Drain noodles in a colander for 10 minutes.
2. Make white sauce: In microwave, melt margarine on power level 30 in Pyrex measuring cup until melted; stir in flour with wire whip; microwave on high power for one minute.
3. Microwave milk on power level 70 until warm; add milk to margarine-flour mixture; microwave on 70 until thick; stir with wire whip every 45 seconds.
4. Add grated cheese and stir until cheese is melted.
5. Spray casseroles with vegetable spray; put drained macaroni in casserole; add sauce; top with bread crumbs. Add pepper.
6. Bake at 375°F until browned, about 10 to 15 minutes; serve or cover with aluminum foil and freeze.
7. To reheat, bake frozen at 375°F for 30 minutes.
   Yields 1 serving.

Nutrient Analysis: (by Nutritionist III).
Note: Nutrient analysis is based on uncooked weight.

Nutrients	Units	per 100 g	per 285-g serving
Food energy	kcal	161	458
Protein	g	7.1	20.1
Fat	g	9.1	25.8
Carbohydrate	g	13.0	37.0
Saturated fat	g	4.7	13.3
Polyunsaturated fat	g	0.8	2.4
Monounsaturated fat	g	2.8	7.9
Cholesterol	mg	22.6	64.4
Calcium	mg	173	493
Phosphorus	mg	144	410
Potassium	mg	108	308
Sodium	mg	158	450