CRAFT & STUDIO · BOOK 4

Vegan Meal Prep Math

Batch Cooking, Protein, Cost per Portion and the Freezer Worked Out Step by Step — 48 Plant-Based Freezer Meals for Your Kitchen, Your Budget and a Small Meal-Prep Business



Weigh it, portion it, freeze it, price it fairly.

SIZU RIATTO

How to use these sheets

Print as many copies as you like, one set for each month, and keep them by the scale and the freezer. **Template A** is the shopping list: the month's five recipes added up, the packs to buy rounded up, and what will be left over. **Template B** is the cook-session plan: what each session puts in the freezer against the freezer's daily limit, the shallow pans, the cooling deadlines to write down, and a cooling log. **Template C** is the batch and portion sheet: each pot's cooked weight, the portion for every box, how full the box is, the protein a portion, and the label lines. **Template D** is the Box Run profit sheet: a week's sales and costs, the profit, the first year's fixed costs and the break-even weeks.

Each sheet shows the book's own Freezer Month and Box Run, worked in full in the chapters: portions in Chapters 1 and 2, yields in Chapters 3 to 5, protein in Chapters 6 to 8, the freezer and the cooling clock in Chapters 9 and 10, the money in Chapters 11 and 12, and the plan in Chapter 13. The calculators at **mathworkbook.netlify.app/calculators** do the same arithmetic with your numbers.

These are planning sheets, not a food-safety assessment or diet advice. Cooling, re-heating and storage times are the FDA Food Code's, USDA FSIS's and the UK Food Standards Agency's: check them at the source, with a thermometer. Selling cooked food follows the rules where you live. Prices are illustrative, from November 2026.

Quick Reference

Two pages to photocopy and tape inside a cupboard door, or to the lid of the freezer.

QUICK REFERENCE

The Rules of Thumb, chapter by chapter

1. Portion = (full pot − empty pot) ÷ portions. Round the target down; the last box gets the rest. Scale every ingredient by one factor.

2. Pot volume = π × r × r × depth. Use about 80 % of a stovetop pot; a pressure cooker never above ⅔, and ½ for beans and grains (your manual).

3. Cooked beans = dry × that bean's own swell factor. Weigh one batch. Dried red kidney beans boil hard first, never straight into a slow cooker.

4. Cooked grain = dry × its factor; water = what the grain drinks + the steam. Chill and freeze cooked rice within the hour (UK FSA).

5. Cooked weight = weight in − weight lost. Yield factor = cooked ÷ raw. Weigh the pot, then divide.

6. Protein = grams × protein per 100 g ÷ 100, every line added, ÷ portions. % DV = grams ÷ 50 × 100.

7. Price the protein, not the pack: cost per 20 g = 2 × price per kg ÷ protein per 100 g.

8. Portions = dinners × eaters. Packs = grams needed ÷ grams a pack, rounded **up**. Check the floor and the week's ceiling.

9. Fill % = portion ÷ density ÷ box mL × 100. Freeze no more than 2 to 3 lb of food per cu ft a day (NCHFP).

10. Shallow, cold, labeled, and hot once: the fridge within 2 hours, about 2 in deep; reheat to 165 °F (74 °C).

11. Cost the grams, then the box, then divide: cost per plate = everything the month cost ÷ portions.

12. Profit = sales − every cost in the week. Break-even weeks = fixed costs ÷ profit a week, rounded **up**.

QUICK REFERENCE

The formulas

Portion. Portion = (full pot − empty pot) ÷ number of portions. Write the empty pot's weight on tape on the pot.

Scale factor. Factor = portions you want ÷ portions the recipe makes; every ingredient × the same factor. The Box Run: 60 ÷ 40 = 1.5.

Pot volume. A cylinder: mL = π × r × r × depth, all in cm (r = half the inside width). In inches: in^3 ÷ 57.75 = US quarts. Volume = weight ÷ density (a stew is about 1 g per mL: weigh a level cup to check).

Beans and grains. Cooked = dry × (1 − w_dry) ÷ (1 − w_cooked), with each water content (FDC) as a fraction. The solids stay; only water moves.

Rice water. Water to add = dry × (factor − 1) + the steam your pot loses. Start from the packet: long-grain white 2 : 1, brown 2¼ : 1 by volume (USA Rice).

Yield. Yield factor = cooked weight ÷ raw weight. Loss % = weight lost ÷ weight in × 100.

Protein. Grams of protein = food grams × protein per 100 g ÷ 100. The book's planning floor: **20 g** a dinner portion, 40 % of the 50 g Daily Value. A planning figure, not advice.

Protein cost. Cost per 20 g of protein = 2 × price per kg ÷ protein per 100 g. For a recipe: food cost ÷ grams of protein × 20.

Box fill. Fill % = portion (g) ÷ density (g per mL) ÷ box (mL) × 100. A "32 oz" box is fluid ounces: 946 mL. Water grows about 9 % as it freezes: leave headspace.

Freezer. Liters = cu ft × 28.32. Unfrozen food a day = cu ft × 2 to 3 lb (NCHFP); kg = lb × 0.4536. A 7 cu ft chest: 6.35 to 9.53 kg a day.

Energy. Heat (J) = grams × 4.186 × the rise in °C; kWh = J ÷ 3,600,000; from the cooktop = heat ÷ its efficiency (ENERGY STAR: induction about 85 %, electric coil 75–80 %, gas about 32 %).

Cost per portion. Price per kg = pack price ÷ pack kg. Recipe cost = Σ grams ÷ 1,000 × price per kg. Cost per plate = (food + boxes and labels + cooking energy + freezer running) ÷ portions.

Markup and margin. Markup = (price − cost) ÷ cost. Margin = (price − cost) ÷ price. Say which one, and what the cost includes.

QUICK REFERENCE

Profit. Profit a week = sales – food – boxes – kitchen – freezer shelf – delivery – card fees.

Break-even. Weeks = first-year fixed costs ÷ profit a week, **rounded up** (US Small Business Administration). In money: fixed costs ÷ (profit ÷ sales).

QUICK REFERENCE

Food safety, with whose rule it is

Cooling at home (US). Into the fridge within **2 hours** (1 hour above 90 °F), in shallow containers (USDA FSIS); shallow means about **2 in (5 cm)** of food (Mississippi State and Kansas State extension).

Cooling for a business (US). 135 → 70 °F (57 → 21 °C) within 2 hours, and to 41 °F (5 °C) within 6 hours in total (FDA Food Code 2022, 3-501.14). Write the clock down.

Cooling in the UK. Cool, then into the fridge within **1–2 hours** (UK Food Standards Agency).

Rice. Chill it as fast as you can, ideally within **1 hour**; freeze it within an hour of cooking; no more than **1 day** in the fridge; reheat it once (UK FSA). The *Bacillus cereus* toxin survives reheating (FDA *Bad Bug Book*). The book freezes grains on cook day.

Kidney beans. Dried red kidney beans: soak, drain and boil hard for **at least 10 minutes** (the FDA's consumer advice says 30) before any slow cooker (FDA *Bad Bug Book*).

Cold. Fridge **40 °F (4 °C)** or below (FSIS); **41 °F (5 °C)** for a business (Food Code); **0–5 °C** (FSA). Freezer **0 °F (–18 °C)**: safe while it stays there; soups and stews best within **2–3 months** (FSIS).

Fridge days. FSIS 3–4 days; the FSA 2 days (rice 1); the Food Code up to 7 days with a date mark, the day made counting as Day 1. Follow the one that governs you.

Thaw. In the fridge (tomorrow's box tonight), in cold water changed every 30 minutes, or in the microwave and eat it at once (FSIS). Never on the counter.

Reheat. To **165 °F (74 °C)**, soups to a rolling boil (FSIS); the Food Code: 165 °F for 15 seconds, a microwaved dish then stands 2 minutes; the FSA: steaming hot, 70 °C for 2 minutes, **once only**.

QUICK REFERENCE

Stop. Selling cooked meals, a “high protein” or health claim, a diet for a medical need: read Chapters 8, 10 and 12, then ask the authority that applies to you.

Template A — The Shopping List

A clean printable copy is at **mathworkbook.netlify.app/go/mealprep-shopping-list**.

Month: _____Portions planned: _____

Store(s): _____Date of prices: _____

Read every label for animal products (tortillas, broths, spice blends, “natural flavors”) and for allergens, and keep a note of what you found with this sheet.

Kit, bought once

Kit	Have it?	Price	Notes
Stockpot: size (qt or L), inside width and height			
Pressure cooker or a second pot, for dried beans			
Kitchen scale, reads in grams			
Scale big enough for a full pot (optional)			
Chest freezer, or freezer space: cu ft or L			
Freezer thermometer and fridge thermometer			
Food thermometer, for the reheat check			
Shallow pans or trays for cooling, about 2 in (5 cm) deep			
Marker and labels that stay on in the freezer			
Total			

The month's food

The book's column is one Freezer Month: five recipes, 40 portions (Chapter 13). **Packs to buy** = what the month needs ÷ what one pack holds, rounded **up**. Cross the book's column out and write your own beside it.

Beans, grains and protein	Book's month	Packs to buy	Yours	Price paid	Label read
Dried black beans	500 g	2 × 1 lb bag			
Dried chickpeas	500 g	2 × 1 lb bag			
Dried pinto beans	300 g	1 × 4 lb bag			
Red lentils	500 g	2 × 1 lb bag			
Green or brown lentils	500 g	2 × 1 lb bag			
Brown rice	650 g	1 × 2 lb bag			
White rice, long-grain	400 g	1 × 2 lb bag			
Pearled barley	150 g	1 × 1 lb bag			
Extra-firm tofu	1,191 g	3 blocks, 14 oz			
Textured soy protein	100 g	1 × 12 oz bag			
Burrito tortillas	8	1 pack of 8			
Subtotal					

Vegetables, cans and spices	Book's month	Packs to buy	Yours	Price paid	Label read
Onions (3.09 lb)	1,400 g	by weight			
Green bell peppers (1.10 lb)	500 g	by weight			
Sweet potatoes	600 g	1 × 3 lb bag			
Potatoes	400 g	1 × 5 lb bag			
Carrots	300 g	1 × 1 lb bag			
Garlic, peeled	80 g	1 × 6 oz pack			
Frozen spinach	10 oz	1 × 10 oz box			
Frozen peas	12 oz	1 × 12 oz bag			
Frozen corn	12 oz	1 × 12 oz bag			
Crushed tomatoes	2,581 g	4 × 28 oz can			
Tomato paste	170 g	1 × 6 oz can			
Coconut milk	762 g	2 × 13.5 fl oz can			
Chili powder	36 g				
Ground cumin	14 g				
Curry powder	44 g				
Canola oil	140 g				
Salt	48 g				
Subtotal					

Rounding up leaves some over: about 407 g of black beans, three-quarters of a can of crushed tomatoes and more than half a bag of white rice. Chapter 8 shows what to do with them, and the next month's list is shorter for it.

Boxes, bags and labels

Packaging	Book's month	Yours	Price paid
32 oz round deli boxes with lids (chili, soup)	16		
30 oz two-compartment boxes (dal, curry)	16		
Quart freezer bags (burritos)	8		
Labels	40		

Before you sell (the Box Run only)

Check	Done	Date
Which kitchen the rules allow for cooked, frozen meals (state, county or council)		
Health permit, or council registration, and its fee		
Shared kitchen booked: hours, rate, freezer shelf		
Food-safety certificate (manager or handler, as required)		
Insurance, at the level the kitchen asks for		
Label wording and allergens checked (Chapter 12)		

Template B — The Cook-Session Plan

A clean printable copy is at **mathworkbook.netlify.app/go/mealprep-cook-plan**.

Weekend 1: _____Weekend 2: _____

Freezer size: _____cu ft = _____L (cu ft × 28.3)

Day limit: _____to _____kg (NCHFP: 2 to 3 lb of food per cu ft a day)

The book's 7 cu ft (198 L) chest takes 6.35 to 9.53 kg a day. Time your first session and put your own minutes and weights in place of the book's.

Before the first weekend

Job	Done	Notes
Freezer at 0 °F (−18 °C) or colder; set to −10 °F (−23 °C) about 24 h before a session (NCHFP)		
Room in the freezer for the boxes, spread out in one layer until they are solid		
Fridge at 40 °F (4 °C) or colder, with room for the cooling pans		
Empty pot weighed; its weight written on tape on the pot		
Shopping done (Template A); boxes, bags and labels ready		
Dried beans soaked overnight, or a longer cook planned (Chapter 3)		

The four sessions

No.	When	Cook	Book's kg	Your kg	Under your limit?	Done
1	Weekend 1, Saturday	Chili and burritos	7.64 kg			
2	Weekend 1, Sunday	Soup	4.61 kg			
3	Weekend 2, Saturday	Dal, with brown rice	4.83 kg			
4	Weekend 2, Sunday	Curry, with white rice	4.18 kg			

Session 1 puts 7.64 kg into the freezer, more than the 6.35 kg the book's chest takes at 2 lb per cu ft. Freeze it in two lots a few hours apart, chilling the second lot in the fridge meanwhile, or move a recipe to another day (Chapter 9).

Every session, in order

Step	Job	Time	Done
1	Weigh every ingredient into the pot (Template C has the grams)		
2	Cook. Dried kidney beans, if any, boiled hard first: at least 10 minutes, FDA says 30		
3	Weigh the full pot; minus the empty pot = cooked weight; ÷ 8 = a portion		
4	Rice: cooled in a thin layer and frozen within 1 hour of cooking (UK FSA)		
5	Stew into shallow pans about 2 in (5 cm) deep; into the fridge within 2 hours (USDA)		
6	Fill each box to its portion weight on the scale; lid on		
7	Label: name, date made, weight, "reheat to 165 °F (74 °C)"		
8	Into the freezer, spread out; stacked once frozen solid		

The cooling log

For a business, the FDA Food Code's rule: from 135 °F (57 °C) to 70 °F (21 °C) within 2 hours, and to 41 °F (5 °C) or below within 6 hours in all. At home, USDA's rule is into the fridge within 2 hours. Write the clock times down.

Recipe	Off heat	Into pans	Temp at 2 h	Temp at 6 h	In freezer	OK?
Chili						
Burritos						
Soup						
Dal						
Brown rice						
Curry						
White rice						

The freezer map: ten stacks, oldest first

Each stack is one recipe's four boxes. Tick a box off when it comes out; eat the oldest date first.

Stack	Recipe	Date made	Where	1	2	3	4
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

The week's thaw plan

Move tomorrow's box from the freezer to the fridge tonight. USDA keeps a thawed box 3 to 4 days in the fridge; the UK Food Standards Agency says to use it within 24 hours of thawing. Reheat to 165 °F (74 °C) (USDA), stirred, and only once (UK FSA).

Dinner	Box	To the fridge, night before	Reheated to 165 °F	Done
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				

Template C — The Batch and Portion Sheet

A clean printable copy is at **mathworkbook.netlify.app/go/mealprep-batch-sheet**.

Month: _____Session: _____Date made: _____

The pot: cooked weight and the portion

Weigh the empty pot first and write its weight on tape on the pot. Cooked weight = the full pot – the empty pot. A portion = cooked weight ÷ 8. Rice is cooked and weighed on its own, and goes into its own compartment.

Recipe	Book's pot	Book's rice	Book's portion	Your full pot – empty pot	Your ÷ 8
Chili	4,054 g		507 g		
Dal	3,641 g	1,187 g	455 g + 148 g rice		
Curry	3,059 g	1,120 g	382 g + 140 g rice		
Burritos	3,018 g	in filling	377 g + tortilla 70.9 g		
Soup	4,606 g		576 g		

If your cooked weight is less than the book's, the pot lost more steam than the book's planning figure: the portions are a little smaller, not wrong. Divide what you have (Chapter 5).

Box by box

Box on the scale, tare, fill to the portion weight. The last box gets what is left; write its weight too.

Recipe	1	2	3	4	5	6	7	8	Total
Chili									
Dal									
Curry									
Burritos									
Soup									

Protein, the box and the label

Protein is arithmetic from the food tables (Chapter 6). The book's planning floor is 20 g a dinner portion, 40 % of the 50 g Daily Value: a line to check against, not advice. Fill = portion ÷ the box's volume, taking a stew as about 1 g per mL; leave room for it to grow as it freezes (Chapter 9).

Recipe	Book's protein	Yours	Box	Book's fill	Book's net weight	Allergens
Chili	25.2 g		32 oz round	54 %	507 g (17.9 oz)	soy (textured vegetable protein)
Dal	22.7 g		30 oz 2-part	68 %	604 g (21.3 oz)	read labels
Curry	26.3 g		30 oz 2-part	59 %	522 g (18.4 oz)	soy (tofu)
Burritos	28.5 g		quart bag	47 %	448 g (15.8 oz)	soy, wheat
Soup	20.8 g		32 oz round	61 %	576 g (20.3 oz)	barley (gluten)

The label

At home, a label needs only what you will want to know in two months' time. If you sell, the rules where you sell decide the rest: Chapter 12 lists them, and its Stop Line says who to ask.

Line	Book's chili	Yours
Name	Black Bean & Sweet Potato Chili	
Date made	the cook-session date	
Net weight, grams then ounces	507 g (17.9 oz)	
Reheat	to 165 °F (74 °C), stirred, once	
Allergens	Contains: soy	
If you sell: ingredients, heaviest first		
If you sell: business name and address		
If you sell: keep-frozen line, and any statement your state or council requires		

Template D — The Cost, Price and Profit Sheet

A clean printable copy is at **mathworkbook.netlify.app/go/mealprep-profit-sheet**.

Business: _____Meals a week: _____Date of prices: _____

Every price is yours: write down what you paid, with shipping and tax. The book's column is the Box Run (Chapters 12 and 13): the five recipes × 1.5, 60 meals a week for 12 customers.

The food: one batch of one recipe

Price per gram = pack price ÷ grams in the pack. Cost a batch = grams a batch × price per gram. A meal's food = the batch ÷ the portions it makes.

Ingredient	Pack price	Grams in pack	Price per gram	Grams a batch	Cost a batch
Total, one batch					

The week's costs, and a meal's share

Line	Book's week	Book's meal	Your week	Your meal
Food, all five recipes	83.88	1.40		
Boxes, bags and labels	12.28	0.20		
Shared kitchen: hours × rate (6 × 25)	150.00	2.50		
Freezer shelf: 70 a month × 12 ÷ 52	16.15	0.27		
Delivery: miles × rate (30 × 0.76)	22.80	0.38		
Card fees: 2.6 % of sales + 0.15 an order	17.40	0.29		
Costs	**302.52**	**5.04**		

The book takes the shared kitchen's hourly rate to cover its gas and electricity, so the Box Run has no separate energy line; ask your kitchen whether yours does. Your own kitchen hours are a step: one more customer can mean one more hour (Chapter 12).

The price

Check	The book's	Yours
A frozen vegan ready meal, 9.5 oz	6.29	
A fast-casual vegan bowl, in store	9.15–11.50	
A plant-based meal service, a meal	11.13–13.49	
Your price, a meal	10	
Left over a meal = price − costs a meal	4.96	
Markup = left over ÷ costs	98.3 %	
Margin = left over ÷ price	49.6 %	

Say which you mean: a markup and a margin on the same meal are never the same number.

One week

Line	Book's week	Yours
Sales: customers × meals × price (12 × 5 × 10)	600.00	
Costs (above)	302.52	
Profit for the week	**297.48**	
Hours: kitchen + shopping, delivery and the books	6 + 5	
Profit an hour, all hours counted	27.04	

Fixed costs for the first year

Fixed cost	Book's year	Yours
County health permit (or council registration)	763.00	
Product liability insurance	299.00	
Food-safety manager certificate	179.00	
Business license	34.00	
Shared-kitchen membership	150.00	
Insulated delivery bags (4)	87.96	
Kitchen scale	15.00	
Other: labels printer, website, sample batches		
Fixed costs	**1,527.96**	

Break-even

Break-even weeks = fixed costs ÷ profit for a week, **rounded up**.

Break-even	The book's	Yours
Fixed costs ÷ profit a week	1,527.96 ÷ 297.48 = 5.14	
Weeks to break even, rounded up	6	
Weeks you will run in a year	48	
The year: weeks × profit a week – fixed costs	12,751.30	

The book's figures are a worked example with illustrative prices from November 2026, before tax and before you pay yourself anything beyond the profit; they are not a promise of what you will earn. Before you sell a meal, read Chapter 12's Stop Line: which kitchen you may cook in, what the label must say and what tax applies all depend on where you sell.