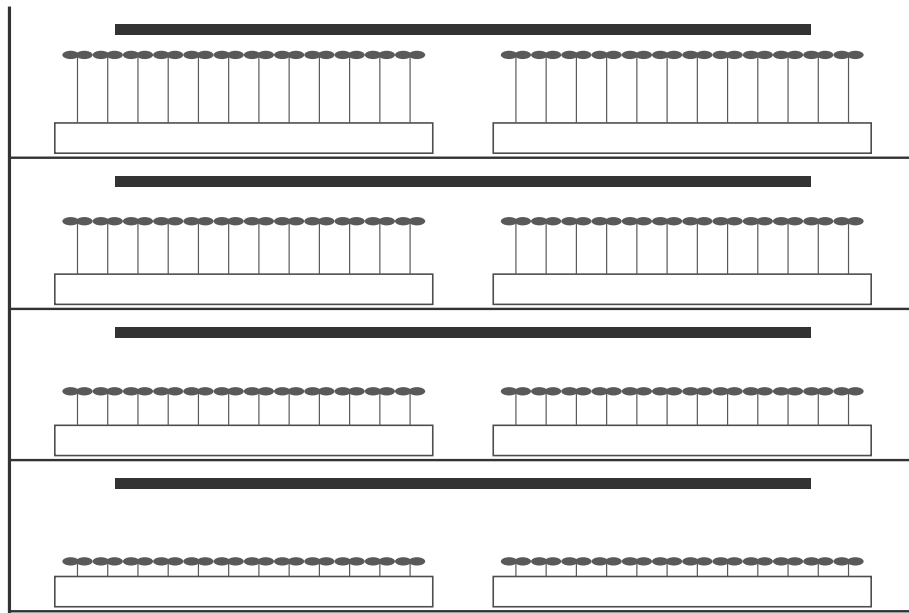


MAKE IT ADD UP • BOOK 1

Grow by Numbers

**Set Up a Microgreen Shelf That Feeds Your Home and Can
Pay Its Way, and Learn Ratios, Sequences, Exponentials
and Logarithms Along the Way**



Build it. Predict it. Measure it.

SIZU RIATTO

How to use these sheets

Print as many copies as you like and keep them by the shelf. **Template A** is the sowing calendar for the first 30 days: two trays every three days, the crops in turn, the soak, sow and cut jobs and the trays standing each day. **Template B** is the harvest log: one line a tray, the day and the grams you called before the cut beside what the scale said, and the Harvest Score for the first eight trays. **Template C** is the Call It log: one call a chapter, its measurement, the gap and the points. **Template D** is the label sheet: six golden labels, 50 × 81 mm, with the net weight, the use-by date and the allergen line. **Template E** is the cost and price sheet: the cost to grow a tray, what it brings back, the kit and the break-even, and a week of surplus.

Each sheet shows the book's own Microgreen Shelf, worked in full in the chapters: the calendar in Chapter 1, the seed in Chapter 2, the growth in Chapters 3 to 6, the label in Chapter 7, the light in Chapter 8, the cold chain in Chapter 9 and the money in Chapter 10. The Quest Map and the Trophy page are on the printables page, sizuriatto.com/go/greens-printables, and the calculators at sizuriatto.com/calculators do the same arithmetic with your numbers.

These are planning sheets, not food-safety, electrical or legal advice. The shelf was worked out on paper from published figures: weigh and measure your own. LED lights and water share a shelf: plug-in only, through a GFCI or RCD outlet. Selling food has rules where you live. Prices are illustrative, from October 2026.

Quick Reference

Two pages to photocopy and pin up beside the shelf. Every formula in the book, chapter by chapter, with the shelf's own number beside it.

■ QUICK REFERENCE

The formulas, chapter by chapter

- 1. Equal steps (arithmetic sequence).** n -th term: $a_n = a_1 + (n - 1) \times d$. Sum of n terms: $n \times (a_1 + a_n) \div 2$ (Gauss's pairing). *Shelf: sow on day 0 + $(n - 1) \times 3$; the tenth sowing is day 27. Area = length $\times$ width; $\text{in}^2 \times 6.4516 = \text{cm}^2$.*
- 2. Ratio and proportion.** Unit rate = one quantity $\div$ the other. Scale: new = old $\times$ (new size $\div$ old size). Seeds = seed grams $\div$ thousand-seed weight $\times$ 1,000. *Shelf: greens per gram of seed, radish 10, broccoli 23.1, sunflower 4.7, pea 1.5.*
- 3. Doubling (geometric sequence).** n -th term: $a_1 \times r^{n-1}$. Sum: $a_1 \times (r^n - 1) \div (r - 1)$. Doublings = $\log_2(\text{end} \div \text{start})$. Doubling time = $\ln 2 \div \ln(1 + \text{rate})$; the rule of 72: about $72 \div$ the percent rate. *Shelf: radish $\times 10$ is 3.32 doublings.*
- 4. The per-step multiplier (roots).** Factor = $(\text{end} \div \text{start})^{(1 \div \text{steps})}$. Percent a step = $(\text{factor} - 1) \times 100$. Monthly to yearly: $(1 + m)^{12} - 1$, never $m \times 12$. *Shelf: radish $10^{(1 \div 9)} \approx 1.29$ a day.*
- 5. The S-curve (logistic).** $P(t) = K \div (1 + e^{(-r(t - m))})$: ceiling K , rate r , midpoint m . Gain a day = $r \times P \times (1 - P \div K)$, fastest at half the ceiling. *Shelf: radish ceiling about 311.1 g; one day past day 9 adds about 11.5 g.*
- 6. Logarithms.** If $b^t = x$, then $t = \log x \div \log b$. On the S-curve: $t = m - \ln(K \div P - 1) \div r$. pH: each step down is 10 times the acid; two readings differ by $10^{(\text{difference})}$. *Shelf: radish reaches 250 g on about day 7.4.*
- 7. Fibonacci and ϕ .** Each term = the two before added. Neighbors' ratio $\rightarrow \phi = (1 + \sqrt{5}) \div 2 \approx 1.618$. Golden angle = $360^\circ \times (1 - 1 \div \phi) \approx 137.5^\circ$. Golden rectangle: long side = short side $\times \phi$. *Shelf: the label, 50×80.9 mm.*

QUICK REFERENCE

8. Power laws and light. $y = k \times x^n$ (the variable in the base). Point source: $I_2 = I_1 \times (d_1 \div d_2)^2$. Long bar close up: nearer $I_2 = I_1 \times (d_1 \div d_2)$. kWh = watts $\times$ hours $\div$ 1,000. *Shelf: 2.56 kWh a day; at 35 cm about 71 % (bar) or 51 % (point) of the light at 25 cm.*

9. Decay. $N = N_0 \times (1/2)^{(t \div h)}$, h the half-life. Halves every Δ °C: $Q_{10} = 2^{(10 \div \Delta)}$. *Shelf: 7 days at 5 °C; about 3.5 days at 11 °C.*

10. Money. Cost to grow a tray = seed + mix + light. Contribution = price – the costs of that sale. Markup = profit $\div$ cost; margin = profit $\div$ price. Break-even = fixed costs $\div$ contribution per unit, **rounded up**. *Shelf: 324 $\div$ about 21.27 a tray $\rightarrow$ 16 trays.*

QUICK REFERENCE

The game and the checks

Call It, Check It. Gap = (measured – call) $\div$ measured, ignoring the sign. Within **5 %**: 3 points; within **10 %**: 2; within **20 %**: 1; beyond: 0, and find out why.

The Harvest Score (the first 8 trays). Gold: total grams within 10 % of your total call and every tray cut within 1 day of its call. Silver: within 20 % and 2 days. Bronze: eight trays cut, weighed and logged.

The calendar. Two trays every **3 days**; radish $\rightarrow$ broccoli $\rightarrow$ sunflower $\rightarrow$ pea; the rotation repeats every **12 days**; never more than **8** trays standing.

Seed a tray. Radish **28 g**, broccoli **13 g**, sunflower **85 g** (soak 8 h), pea **150 g** (soak 10 h). Mix about **3 L** (3.17 qt), 1 in deep.

Harvest day and grams (planning figures: weigh yours). Radish day **9**, 280 g; broccoli **12**, 300 g; sunflower **10**, 400 g; pea **11**, 225 g.

Light. **25 cm** (about 10 in) above the trays, **16 h** a day; 40 W a tier.

Water. Tap water of pH 6.5 to 8.5 is fine for a soil or coir shelf; the 5.5 to 6.5 band is for nutrient water.

Label. Net wt 2 oz (56 g): the fill in ounces, and the grams rounded down.

■ QUICK REFERENCE

Safety, every time

Power. Lights on a GFCI (US) or RCD (UK) protected outlet; test it monthly. A drip loop on every cord. Plugs, timer and adapter above the water, never below the trays. No extension lead plugged into another. Plug-in only: anything hard-wired is an electrician's job.

Food. Untreated seed sold for sprouting or microgreens. Wash hands at least 30 seconds, and the trays, scissors and knives. No soil on cut greens. Keep them at **5 °C (41 °F)** or colder. Mold, a sour smell or slime: throw the tray away.

Mix. Gloves, open the bag slowly and away from your face, dampen before handling, wash your hands after. Fever, cough or breathlessness after handling mix: see a doctor.

Selling. Register where you must (UK: with your council, at least 28 days before trading, free). Label honestly; mustard is a legal allergen in the UK. Insurance. **No health claims.**

Template A — The Sowing Calendar (the first 30 days)

A clean printable copy is at mathworkbook.netlify.app/go/greens-printables.

Two trays every three days, the crops in turn: radish, broccoli, sunflower, pea. The book's plan is printed in the Sow and Cut columns; write your dates in the second column and tick each job as it is done. Sunflower and pea are soaked the evening before they are sown. A tray cut in the morning frees its place for that day's sowing, so the shelf never holds more than eight. "Standing" is the trays on the shelf once the day's cutting and sowing are done.

Day 0 is: _____ Crops in turn: _____

Grow by Numbers

Day	Date	Soak tonight	Sow (pair)	Cut (pair)	Standing	Done; notes
0			1: radish		2	
1					2	
2					2	
3			2: broccoli		4	
4					4	
5		sunflower			4	
6			3: sunflower		6	
7					6	
8		pea			6	
9			4: pea	1: radish	6	
10					6	
11					6	
12			5: radish		8	
13					8	
14					8	

Template A — The Sowing Calendar (the first 30 days)

Day	Date	Soak tonight	Sow (pair)	Cut (pair)	Standing	Done; notes
15			6: broccoli	2: broccoli	8	
16				3: sunflower	6	
17		sunflower			6	
18			7: sunflower		8	
19					8	
20		pea		4: pea	6	
21			8: pea	5: radish	6	
22					6	
23					6	
24			9: radish		8	
25					8	
26					8	
27			10: broccoli	6: broccoli	8	
28				7: sunflower	6	
29					6	

The month in numbers. The book's plan: 10 sowings, 20 trays sown, 7 harvests (14 trays) in the first 30 days, about 4,370 g cut. Pairs 8, 9 and 10 are cut on days 32, 33 and 39. Yours: sowings _____ trays cut _____ grams cut _____

Template B – The Harvest Log

A clean printable copy is at mathworkbook.netlify.app/go/greens-printables.

One line a tray. **Before you cut**, write your called day and your called grams, in pen. Then cut, weigh the greens alone (tare the bowl first) and fill in the rest. Gap = (weighed – called) ÷ weighed, ignoring the sign. Points the Call It way: within 5 % scores 3, within 10 % scores 2, within 20 % scores 1, beyond that 0. The book's planning figures, if you want a starting point for your call: radish day 9, 280 g; broccoli day 12, 300 g; sunflower day 10, 400 g; pea day 11, 225 g.

The first eight trays: the Harvest Score

Tray	Crop	Sow day	Called day	Cut day	Called g	Weighed g	Gap	Points
1	radish	0						
2	radish	0						
3	broccoli	3						
4	broccoli	3						
5	sunflower	6						
6	sunflower	6						
7	pea	9						
8	pea	9						
Total								

Your Harvest Score	Yours	The level
Total gap: (total weighed – total called) ÷ total weighed		Gold within 10 %; Silver 20 %
The widest miss on a cut day, in days		Gold 1 day; Silver 2 days
Eight trays cut, weighed and logged?		Bronze
Your level		

Trays 9 to 20: the rest of the first 30 days

Tray	Crop	Sow day	Called day	Cut day	Called g	Weighed g	Gap	Points
9	radish	12						
10	radish	12						
11	broccoli	15						
12	broccoli	15						
13	sunflower	18						
14	sunflower	18						
15	pea	21						
16	pea	21						
17	radish	24						
18	radish	24						
19	broccoli	27						
20	broccoli	27						

Your calls should close in as the weeks go by: call the second round from the first round's weights, not from the book's.

Template C — The Call It Log

A clean printable copy is at mathworkbook.netlify.app/go/greens-printables.

One line a chapter. Write the call **before** you measure, in pen. Gap = (measured – call) ÷ measured, ignoring the sign. Within 5 % scores 3 points, within 10 % scores 2, within 20 % scores 1; beyond that 0, and find out why, because that is the chapter. Some numbers can only be measured on the running shelf: those lines are checked in Chapter 11.

Ch.	What you call	Your call	Measured	Gap	Points
1	Your tray's inner floor area, from its label; then measure				
2	Radish seeds in 1 g; then count a weighed gram				
3	The weight of 150 g of pea seed after its 10-hour soak				
4	The radish tray's growth factor between two weighings (checked in Chapter 11)				
5	The first radish tray's harvest grams (checked in Chapter 11)				
6	Your tap water's pH (a test strip or meter)				
7	The spiral counts on a pinecone, pineapple or sunflower head				
8	A phone light meter's reading at 50 cm, from its reading at 25 cm				
9	Your fridge's real temperature				
10	Your break-even tray count (checked in Chapter 11)				
	Your points, out of 30				

Each chapter's own Call It box says exactly what to call and how to check it; where it and this line differ, follow the chapter.

The miss that taught you the most. Chapter: _____ What you had assumed:

What you found out: _____

Template D — The Label Sheet

A clean printable copy is at mathworkbook.netlify.app/go/greens-printables.

Chapter 7's golden label: 50 mm wide and $50 \times 1.618 \approx 80.9$ mm tall, so it prints at **50 × 81 mm**. The line across it cuts off a 50 mm square and leaves a smaller golden rectangle below, the same shape turned on its side. The proportion is an aesthetic choice, not a rule. Cut along the dashed lines, or copy the layout onto label stock.

<p>Your farm _____</p> <p>Radish</p> <p>microgreens</p> <p>Net wt 2 oz (56 g)</p> <hr/> <p>Packed: _____</p> <p>Use by: _____</p> <p>Keep at 5 °C (41°F) or colder</p> <p>Allergens: none on the US or UK lists</p> <p>Name, address: _____</p>	<p>Your farm _____</p> <p>Broccoli</p> <p>microgreens</p> <p>Net wt 2 oz (56 g)</p> <hr/> <p>Packed: _____</p> <p>Use by: _____</p> <p>Keep at 5 °C (41°F) or colder</p> <p>Allergens: none on the US or UK lists</p> <p>Name, address: _____</p>	<p>Your farm _____</p> <p>Sunflower</p> <p>microgreens</p> <p>Net wt 2 oz (56 g)</p> <hr/> <p>Packed: _____</p> <p>Use by: _____</p> <p>Keep at 5 °C (41°F) or colder</p> <p>Contains sunflower (named as good practice)</p> <p>Name, address: _____</p>
<p>Your farm _____</p> <p>Pea</p> <p>microgreens</p> <p>Net wt 2 oz (56 g)</p> <hr/> <p>Packed: _____</p> <p>Use by: _____</p> <p>Keep at 5 °C (41°F) or colder</p> <p>Contains pea (named as good practice)</p> <p>Name, address: _____</p>	<p>Your farm _____</p> <p>Mustard</p> <p>microgreens</p> <p>Net wt 2 oz (56 g)</p> <hr/> <p>Packed: _____</p> <p>Use by: _____</p> <p>Keep at 5 °C (41°F) or colder</p> <p>Allergen: MUSTARD</p> <p>Name, address: _____</p>	<p>Your farm _____</p> <p>_____</p> <p>microgreens</p> <p>Net wt 2 oz (56 g)</p> <hr/> <p>Packed: _____</p> <p>Use by: _____</p> <p>Keep at 5 °C (41°F) or colder</p> <p>Allergens: _____</p> <p>Name, address: _____</p>

Net wt 2 oz (56 g). The book's pack holds 2 oz of greens, which is 56.7 g; the grams are rounded **down**, so the label never promises more than the pack holds. Fill each pack a little over and weigh it.

Use by. The date you packed it plus the days your own greens keep in your own fridge. The book plans 7 days at 5 °C (41 °F); Chapter 9 shows why a warmer fridge shortens that fast, and how to test your own.

Allergens. Mustard, including its leaves and sprouted seed, is a legal allergen in the UK and must be named. Sunflower, pea and buckwheat are not on the US or UK lists; naming them is good practice. Wheatgrass is grown from wheat: ask your regulator

before you sell it.

What else a label must carry depends on where you sell. A UK label for food you pack yourself, a US state's labeling rule, a mixed pack that counts as processed food: check with your council or state food office before the first sale (Chapter 10, and its Stop Line). Never add a health claim.

Template E — The Cost and Price Sheet

A clean printable copy is at mathworkbook.netlify.app/go/greens-printables.

Every price here is illustrative: US prices seen in October 2026, without a currency sign. The book's four crops are worked; the last column is for yours, at your prices.

What a tray costs, and what it brings back

For one tray	Radish	Broccoli	Sunflower	Pea	Your crop
Seed a tray, g	28	13	85	150	
Seed price a kg	23.50	30.54	11.05	8.64	
Seed cost = $g \div 1,000 \times$ price a kg	0.66	0.40	0.94	1.30	
Mix, 3 L at about 0.70 a L	2.11	2.11	2.11	2.11	
Days on the shelf	9	12	10	11	
Light = $0.32 \text{ kWh} \times \text{days}$ $\times 0.18$	0.52	0.69	0.58	0.63	
Cost to grow a tray	3.29	3.20	3.63	4.04	
Harvest, g (weigh yours)	280	300	400	225	
2 oz packs = $g \div 56.7$	4.94	5.29	7.05	3.97	
Sold at 5 a pack	24.69	26.46	35.27	19.84	
Packing at 0.33 a pack	1.63	1.75	2.33	1.31	
Contribution a tray	19.77	21.51	29.32	14.49	
Contribution a shelf-day = $\div \text{days}$	2.20	1.79	2.93	1.32	

The packs are counted as fractions so the four crops compare fairly; you sell whole packs.

The kit and the break-even

Fixed costs	The book's	Yours
Shelf; four lights; 16 trays	85; 80; 96	
Timer; GFCI or RCD adapter; scale; sprayer	10; 32; 16; 5	
The kit	324	
Average contribution a tray sold	about 21.27	
Break-even = kit ÷ contribution, rounded up	16 trays	
With a year of insurance (299): $623 \div 21.27$, rounded up	30 trays	

A week of surplus

The week	The book's	Yours
Grams a week, less the household's	$1,405.8 - 700 = 705.8$ g	
2 oz packs, rounded down	12	
Cost of a pack: greens + clamshell + label	about 1.00	
Price of a pack	5	
Contribution a pack	about 4.00	
Sales a week; contribution a week	60; about 48.05	
Weeks to pay back the kit	7	

Before the first sale: register where you must, carry insurance, label honestly, no health claims (Chapter 10's Stop Line). **Paying yourself:** at Missouri's 15 minutes a tray and a wage of 20 an hour, add 5.00 a tray; every crop above still contributes something, and the chapter shows which earns most for your time.