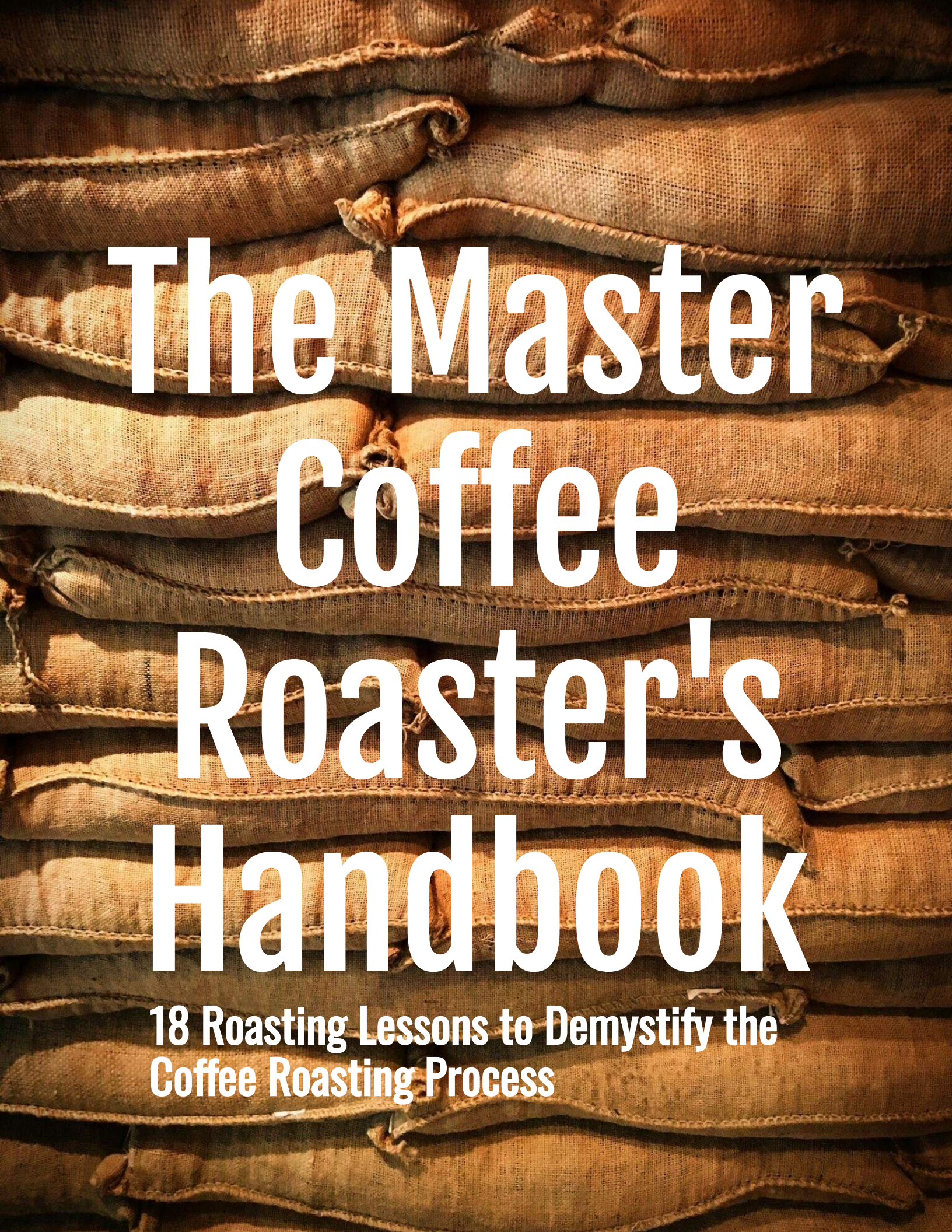


The Master Coffee Roaster's Handbook

18 Roasting Lessons to Demystify the Coffee Roasting Process

✅ Built for home roasters, garage geeks, and micro-batch baristas who are done guessing and ready to roast with confidence.

This guide teaches you how to stop roasting blind. It breaks down the science, steps, and strategy of home roasting so you can finally get consistent, incredible coffee — without wasting another bag of £24 beans.

📘 INTRODUCTION: Why This Handbook Exists

I'm going to be honest with you.

If you're reading this, you've probably ruined more than a few batches of good coffee.

Not because you're careless — but because no one ever actually explained what was going on inside that coffee roaster.

You've read the forums. You've watched the YouTube breakdowns. You've followed someone else's "perfect" curve. And still... your beans come out burnt, sour, flat, or just meh — even when you did "everything right."

You are not alone.

In fact, you're the reason this guide exists.

My Story: From Barista to Coffee Roasting Competitor

I started roasting coffee in a gene cafe many years ago for my mobile coffee-bike business called 'Wheelys'. A simple air-roaster, with a fantastic see-through chamber allowing me to see the coffee seeds turn from green to yellow to brown as the roast progressed. But I had one key problem: no real framework or practical idea of how to roast coffee well! Thankfully my barista experience helped me on my way and I eventually got there - competing in the UK Roasting Championships andplacing 6th and getting selected as a Re:Co Symposium Fellow at World of Coffee Budapest - but it took a mammoth amount of effort and A LOT of trial and error. You'd think it would be simple. Coffee goes in, heat goes up, and somewhere around the first crack, you get great flavor... right?

Wrong.

Over the first 6 months, I ruined countless batches, wasted hundreds of dollars in green beans, and nearly gave up on roasting entirely. I thought maybe I just didn't have the palate, or the gear, or the intuition.

But the truth?

I didn't need better beans.

I didn't need a £1,000 machine.

I just needed to understand what was actually happening.

That's what this handbook is for.

Why Most Home Roasters Struggle

Here's the core problem: Most beginner roasters are flying blind. They've bought the gear. They've watched the videos. But they still don't understand:

- What "first crack" really means.
- How development time actually shapes flavor.
- Why their "consistent profile" still produces wildly different cups.
- When their roast is underdeveloped, baked, or just dead-on-arrival.

🔬 In fact, a 2022 Reddit /r/Coffee survey found that over 60% of home roasters use machines under £500 — yet the majority reported inconsistent results even when using the same beans and time curve.

Why?

Because method > machine. Without understanding development, airflow, rate of rise, and bean behavior, you're just roasting by luck.

What This Guide Will Do For You

This guide is built to do one thing: demystify the roasting process in 18 lessons that actually stick.

No fluff. No jargon. No 90-minute theory lectures.

You're going to learn:

- Why first crack is the beginning — not the end
- How to identify and control development using data you can track
- What consistency actually means (and how to achieve it with home gear)
- How to stop wasting expensive beans on "educated guesses"
- Why your coffee tastes flat today — but didn't yesterday

We'll also break down the exact Between-Batch Protocol used by pros (yes, it matters even on a £500 roaster), teach you how to taste like a builder, and give you a logging system that translates flavor into action.

Who This Is For (And Why It Works)

This handbook is for the home roaster who's done being confused.

You roast in your kitchen, your garage, or your side shed. You track temps manually, scribble down turning points, and squint at your beans trying to figure out if they're underdeveloped… or just resting.

You've burned £24 Ethiopian naturals and regretted every second.

You want control, clarity, and confidence.

You want coffee that tastes like what you imagined — and you want to know how you got there.

This guide works because it's not theory for the sake of sounding smart. Every lesson solves a problem. Every concept connects to a roast you've already done (or ruined).

How to Use This Handbook

Think of this guide as your roast lab manual — one breakthrough per lesson. No skipping ahead. No binge-reading. You apply what you learn, roast, reflect, and move forward.

Each of the 18 lessons tackles one big problem you're probably dealing with right now. If you just read and implement 3 of them, your next roast will already be 10x more predictable. By the time you've finished the book — and roasted alongside it — you'll understand more than most Instagram "roasters" with custom drum setups.

Before You Start

Here's what I need from you:

- Commit to reading and applying each lesson in sequence.
- Keep a roast log for the next 10 batches. (We give you one — print it.)
- Taste everything. Even the bad stuff. You'll learn faster than ever.
- Don't upgrade your gear until you finish this guide. You probably don't need to.

Final Word Before We Begin

You don't need to be a Q grader to roast coffee people love.

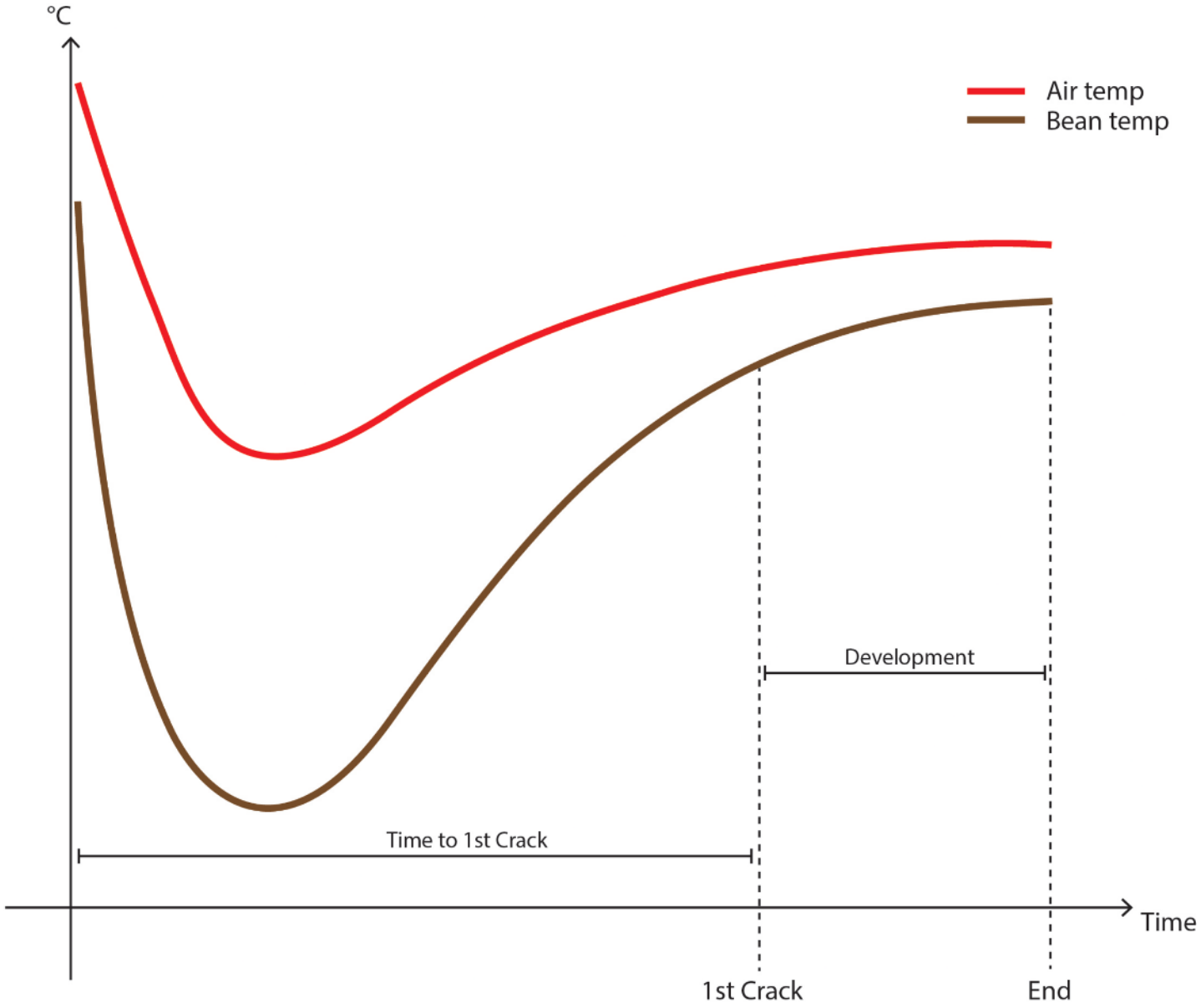
You need understanding, a system, and a feedback loop.

This handbook gives you all three — without wasting another bag or another month wondering what went wrong.

You're not failing. You're just blindfolded.

Let's fix that.

SECTION 1: ROASTING FOUNDATIONS



Lesson 1: What Actually Happens During Coffee Roasting

Stop Roasting Blind. Start Understanding What You're Actually Doing.

If you don't know what's happening inside the bean, you're not roasting — you're reacting.

The single biggest mistake new roasters make is treating coffee roasting like a black box. Beans go in, heat goes up, and eventually something cracks. But unless you understand what the heat is doing inside the bean, you'll never control the flavour outcome.

That's what this lesson fixes.

The Roast Isn't Just "Hotter = Darker"

Roasting isn't about hitting a finish temp. It's about driving a series of complex chemical reactions that shape everything from sweetness to body to acidity.

Here's what you need to know:

🔬 The Three Core Reactions:

1. **Drying Phase (Start to ~150°C / 302°F)**
    - Goal: Evaporate moisture (coffee starts ~10–12% water)
    - Internal bean temp rises steadily, but there's no aroma yet
    - Think of this as the preheat — you're prepping the canvas
2. **Maillard Reaction (~150°C to 180°C / 302–356°F)**
    - Amino acids + reducing sugars = hundreds of flavour precursors
    - Responsible for body, sweetness, and base tones
    - This is where roast profiling starts to matter
3. **Caramelisation & Development (~180°C to 205°C / 356–401°F)**
    - Sugars start breaking down → browning, complexity, bitterness risk
    - First crack usually happens near the start of this window

      Your roast decisions here will define final cup flavour

Inside the Bean: A Chemical Pressure Cooker

A green coffee bean contains over 1,000 volatile compounds — but they don't all develop at once.

Here's what science tells us:

- At around 160°C (320°F), the Maillard reaction kicks off, building precursors to roast flavors like toast, nuts, and chocolate.
- At 170–200°C (338–392°F), caramelization and internal CO_2 buildup begin. This creates pressure and causes the first crack — a literal expansion like popcorn popping.
- CO_2 release continues after roasting: coffee can lose up to 2% of its mass in gas in the first 48 hours.

Common Beginner Mistake: Chasing Color

Color ≠ flavor. At least not directly.

Many new roasters judge progress by bean surface colour — light brown to dark brown to nearly black. The problem? Colour is a surface signal. Flavour develops inside.

Two batches with the same surface colour can taste completely different, depending on:

- Total development time
- Internal bean pressure
- Maillard vs caramelization balance

Why does that matter? Because you're not just heating a bean — you're managing time, pressure, chemistry, and moisture escape.

The "Turning Point" Myth

Many home roasters watch for the "turning point" — when the bean temp bottoms out and begins rising again. But here's what most don't realise:

➡️ The turning point is a lagging indicator.

➡️ What really matters is your Rate of Rise (RoR) from that point forward.

We'll break down RoR in depth in Lesson 7, but for now understand this:

A fast-rising temp can lead to scorching. A stall can kill development. What you do immediately after the turning point matters more than the temp itself.

Flavor = Time x Temp x Chemistry

Think of roasting like this:

You're not cooking coffee. You're constructing flavor compounds.

You don't just need more heat — you need the right heat, at the right time, applied for the right duration.

- A shorter Maillard phase = brighter, acidic, sometimes sour cups
- A long Maillard phase = muted brightness, rounder body, more chocolate
- Overcooked development = flat, bitter, smoky notes

And this is what separates "accidental" roasts from intentional ones.

Recap: What You Should Know Before Lesson 2

✅ Roasting is a chemical progression — not just a temperature race

✅ The Maillard reaction and caramelization are your flavor engines

✅ First crack is a chemical and physical reaction, not a timer bell

✅ Your goal isn't roasting with best guess — it's control

📋 Quick Exercise:

Roast your next batch while noting:

- Drying time to 150°C
- Time between 150–180°C (Maillard)
- Time from first crack to end

You'll start seeing why temperature is only one part of the story when you also note the flavour outcome in the cup.

Coming Up in Lesson 2: The First Crack Isn't the Finish Line

You'll learn:

- What's actually happening when you hear that first pop
- How to time your development phase
- The #1 mistake that ruins flavour post-crack

Lesson 2: First Crack Isn't the Finish Line — It's the Fork in the Road

If First Crack Is the Only Cue You're Using... You're Guessing.

Ask any roasting forum what to look for and someone will say:

"Listen for the first crack."

But here's the part they never explain:

What happens after you hear it determines everything.

What Is First Crack?

First crack is not a finish line — it's a chemical pressure release.

Here's what's really happening:

- As internal bean temps rise (usually around 196–203°C / 385–397°F), water vapor and CO_2 build pressure inside the bean.
- That pressure finally bursts the cellular structure open — like popcorn popping — creating the audible "crack."
- At this point, the development phase begins.

This is the first moment your roast stops being potential... and starts becoming flavor.

"The crack isn't the answer. It's the question. What kind of coffee do you want this to be?"

What First Crack Is NOT:

❌ It's not a signal to end the roast

❌ It's not a guarantee of development

❌ It's not the same every time — even for the same bean

Why First Crack Timing Isn't Enough

Many beginner roasters believe that hearing the first crack at 8 minutes or 200°C is a win. But that's like saying your steak sizzled at 5 minutes — so it must be perfect.

Here's what really matters:

1. When it starts — tells you how aggressive your heat ramp was

2. How long it lasts — tells you how even your internal development is

3. How you manage heat after — determines sweetness, body, and bitterness

The Development Phase Starts Now

Once the first crack begins, your roast enters the development window — the most important phase for shaping final flavor.

This is where:

- Sugars caramelise (adding body and sweetness)
- CO_2 escapes
- Acidity softens or flattens depending on time and heat

The Development Time Ratio (DTR) — covered in Lesson 6 — is the percentage of your total roast that happens after the first crack begins. Target ranges vary by bean and preference, but here's a general guide:

Roast Style	Dev Time %	Flavour Impact
Fast (Scandinavian)	(12–15%)	Light, sometimes sour or grassy
Balanced / medium	(18–22%)	Sweet, rounded, clean flavor, more body
Long (Italian dark)	(25–30%)	More caramelisartion, risk of baked taste

Real Mistake: Dropping Too Soon

Dropping the roast too soon after first crack leads to:

- Underdevelopment (common in beginners chasing "light roast" without understanding DTR)
- Sharp acidity, grassy or hay-like notes
- Beans that look right but taste flat

Stat: In a home roaster case study using a FreshRoast SR540, cupping scores improved by 1.5 points (SCA scale) when development time was extended from 30 to 60 seconds — even when drop temp stayed the same.

So How Do You Use First Crack Properly?

Step 1: Identify it with confidence

- Listen for the first few "pops" that resemble dry twigs snapping
- Use a consistent temp/time marker (log the start time of first crack every roast)

Step 2: Track the full crack phase

- Note the duration (usually 30–90 seconds)
- Watch how fast it accelerates or fades (uneven crack = poor heat balance)

Step 3: Plan your development phase

- Decide before roasting: Is this a bright natural Ethiopian? A chocolatey Brazil?
- Use your intended flavour to guide how long to stay in development
    - Sweet spot: 45–75 seconds for most light to medium roasts
    - Extend carefully for body; cut shorter for acidity

Recap: Key Takeaways

✅ First crack marks the beginning of development — not the end of the roast

✅ How you manage heat after the crack shapes your entire cup

✅ Track when first crack starts and how long you develop beyond it

✅ Use your taste goals to set your DTR target

Mini Drill: Compare First Crack Behavior

Roast the same bean twice:

- Batch A: Drop 20 seconds after first crack
- Batch B: Develop for 60 seconds

  Cup both side-by-side.

Ask: Which is sweeter? Which has more body? Which is flat?

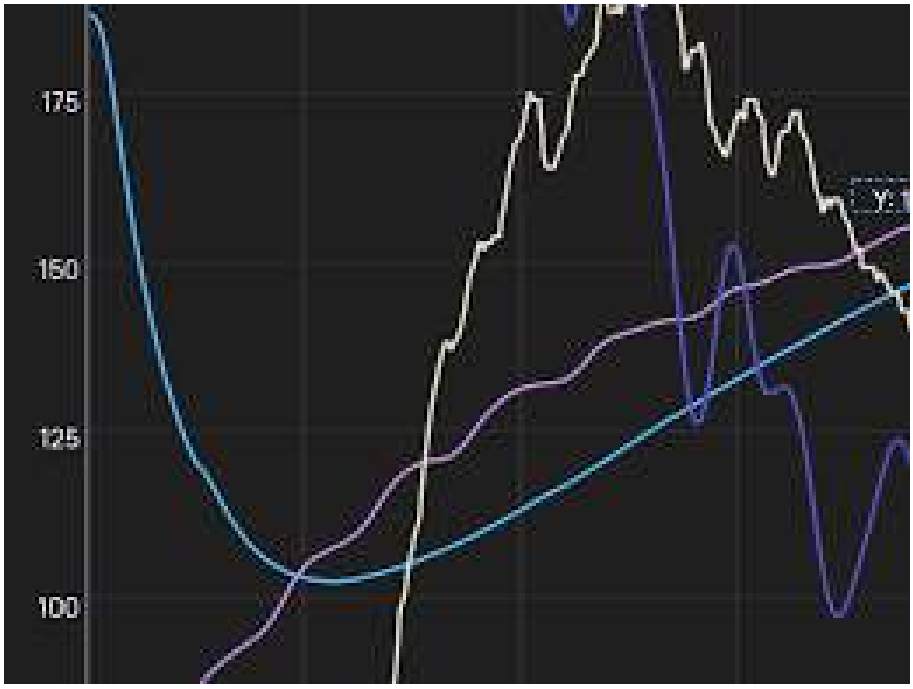
This will be one of your fastest flavor "aha" moments.

Coming Up Next: Lesson 3 — Logging Heat and Time Without Losing Your Mind

You'll learn:

- How to log your roast like a pro (even with no fancy software)
- Why charge temp, turning point, and RoR matter more than total roast time
- The 3 data points that tell you everything

Lesson 3: Logging Heat and Time — Without Getting Lost in the Data



You Can't Repeat What You Don't Track.

If you're roasting without logging, you're not learning — you're just gambling.

Roast logs are your feedback loop, your black box recorder, and your recipe archive. But most home roasters either log too little, or get overwhelmed by data they don't know how to use.

This lesson shows you what to track, how to read it, and how to spot the patterns that actually matter.

The 3 Data Points That Change Everything

Let's simplify: Ignore the noise. You only need to log three essential points to begin dialing in consistency:

1. Charge Temp

When you drop the beans in the roaster.

This affects how fast your roast starts. Too hot, and you'll scorch. Too cold, and you'll stall development.

Target Range (for most setups):

- Drum roasters: 180–210°C (356–410°F)
- Fluid bed roasters: Lower, around 140–170°C (284–338°F)

Track this every time — it's your baseline for comparing batches.

2. Turning Point

The lowest bean temp after charge — when the curve begins to rise again.

It usually happens around 1:00–1:45 into the roast, depending on the roast batch size. It reflects how much heat energy your beans absorbed at the start.

Why it matters:

- If the turning point is too low, your RoR will spike.
- If it's too high, you risk a slow, baked roast.

3. Rate of Rise (RoR)

The speed at which your bean temp increases, measured in °C or °F per minute.

This is your roast's heartbeat.

Key rule:

RoR should decline gradually — not spike or stall.

A declining RoR = controlled development.

A spike after the first crack = bitter roast.

A stall = baked or grassy coffee.

Manual Logging: The Minimalist Approach

You don't need Artisan software to start learning. Here's how to log by hand:

Time (min).	Temp (°C)	Event
0:00	195	Charge
1:30	142	Turning Point

4:15	155	Yellowing Starts
6:00	170	Start of Maillard
8:15	196	First Crack Starts
9:05	203	Drop

Just note the temp and events in real time. (A good rule of thumb is to be consistent when yellowing starts but make sure you listen out for first crack as this will vary depending on the coffee). This gives you a timeline to reflect on flavour outcomes.

Digital Logging: Using Artisan or Typica

Digital roast logging tools like Artisan (free) or Typica (open-source) sync with thermocouples and auto-plot your curve.

They allow:

- Real-time tracking of RoR
- Saved profiles for comparison
- Visual overlays of multiple batches

But warning: Don't fall into the trap of logging everything and learning nothing.

Focus on:

- Curve shape
- RoR slope
- First crack position
- Total development time

📈 Good rule: Your goal is not to copy a curve — it's to understand what caused it.

Common Logging Mistakes

❌ Logging without tasting

If you don't cup after the roast, your log is just a diary of confusion. Connect log data to taste outcome.

❌ Chasing total roast time

9:30 or 11:00 means nothing without context. A fast roast with poor development can taste worse than a long, controlled one.

❌ Copy-pasting someone else's curve

What worked for someone else's machine, voltage, and beans won't guarantee results for yours.

How to Read a Log (and Spot the Pattern)

After 5–10 roasts, you'll start seeing trends:

- Roasts with high charge temps and fast RoR = ashy, hollow cups
- Roasts with long Maillard and even RoR = sweet, balanced cups
- Roasts with flat RoR after first crack = dull, baked flavor

Overlay your best-tasting roast curve and worst. Find where they diverged.

That's your next breakthrough.

Quick Drill: Build Your Baseline

Next roast, log:

- Charge temp
- Turning point temp + time
- Start of first crack
- Drop temp and time

Then taste the cup 24-48 hours later. Ask:

Was it underdeveloped? Bitter? Sweet?

Track these patterns across 5–10 batches, and your roasts will become repeatable — not just lucky.

Coming Up Next: Lesson 4 — Airflow Isn't Optional

You'll learn:

- Why airflow isn't just about smoke control — it's a flavour shaper
- When to increase airflow during the roast (and when not to)
- What your bean's smell + crack behaviour reveal about your airflow settings

🌬️ Lesson 4: Airflow Isn't Optional — It's a Flavour Shaper

If You're Ignoring Airflow, You're Ignoring Flavour.

Most beginner roasters treat airflow like an on/off switch.

But here's the truth: Airflow is one of the most powerful — and underused — tools you have to control flavour. It affects:

- Roast evenness
- Chaff movement
- Bean surface texture
- Final cup clarity, acidity, and sweetness

Let's break it down.

What Airflow Actually Does

Airflow isn't just about removing smoke — it directly impacts heat transfer inside the roaster.

🔥 With good airflow:

- You encourage convection (clean, even heat)
- Remove smoke and volatile compounds (less bitterness)
- Keep beans moving, reducing scorching and tipping

💨 With poor airflow:

- You trap smoke → ashy, dull flavor
- You risk uneven roast development
- You build up heat in dead zones -> burn spots

Airflow by Roast Phase:

1. Drying Phase

- Use low-to-medium airflow
- Goal: Even moisture escape without cooling the beans too fast
- Too much = roast stalls early

2. Maillard Phase

- Slight increase in airflow
- Goal: Remove chaff and smoke
- Too little = smoky, rubbery flavours (especially in naturals)

3. Development Phase (Post-Crack)

- Higher airflow to prevent overbaking and manage RoR drop

🔬 Tip: Volatile compounds like pyrazines and furans — responsible for nutty, caramel, floral, and fruity aromas — are heat-sensitive and must be preserved with proper airflow.

How to Adjust Airflow (Even on Basic Gear)

You don't need a $3,000 fluid-bed roaster. Even if you're using a Behmor, FreshRoast, or Kaldi, you can control airflow with:

- Dampers (on open-drum roasters like Kaldi)
- Fan speed controls (on SR540/FreshRoast units)
- Lid gaps (on poppers or DIY builds - to vent smoke

Simple Hacks:

• If your gear doesn't have airflow control, use ambient ventilation

• Open a window or aim a fan to exhaust chaff/smoke

Common Mistakes

❌ Too Much Airflow Too Soon

Kills bean momentum

❌ No Airflow During Crack

Smoke and CO_2 hang around

❌ Airflow Ignored in Logs

Can't explain cup differences if you don't track it

Quick Test: What Does Airflow Taste Like?

Try this on the same bean:

- Roast A: Low airflow throughout
- Roast B: Moderate → high airflow in dev phase

Cup them side-by-side.

You'll taste the difference in brightness, cleanness, and body.

Coming Up Next: Lesson 5 — Your Gear Isn't Holding You Back

You'll learn:

- Why method beats machine every time
- The exact variables you can control (even on entry-level gear)
- Which tools are overhyped and which are essential

🎛️ Lesson 5: Your Gear Isn't Holding You Back — Your Process Might Be

Stop Blaming the Machine.

Too many home roasters believe the myth:

"If I just had better gear, my roasts would be consistent."

But the truth?

It's not your machine. It's your method.

Over 60% of home roasters use machines under £500 — and many produce competition-level results using just heat, airflow, and attention.

Here's how to work with your gear — not against it.

Common Home Roasters (and What You Can Actually Control)

Machine	Heat Control	Airflow	Manual Agitation	Best For
Popcorn Popper	Limited	Passive	No	Quick & dirty learning
Behmor 2000AB	Programmable	Indirect	No	Low-intervention, consistent
FreshRoast SR540	Manual dial	Yes	No	Fast light roasts, agile control
Kaldi Manual	Full flame	Yes	Yes	Craft, drum-style artisan roasts
IKAWA Home	Pre-set apps	Yes	No	Precision, digital profiling

What You Can Always Control

No matter your setup, you can influence:

- Charge Temperature

  (Preheat time, starting bean vs drum temp)
- Time-to-Crack

  (Use a stopwatch + thermometer combo)
- Development Time

  (From first crack to drop)
- Airflow Timing

  (Fan dials, vent adjustments, even lid removal)
- Tasting Feedback Loop

  (Cup your roast, compare with your log)

Most inconsistent home roasts happen not because of the gear, but because the roaster didn't control what they could.

Stop Chasing Gear. Start Chasing Clarity.

Don't Upgrade Until:

- You can hit the same DTR on two different days
- You've logged at least 20 roasts with cupping notes
- You know what you'd change if you had better controls

The most powerful upgrade isn't a PID controller or dual thermocouples.

It's understanding your heat application, logging, and airflow interaction — and adjusting with intent.

Quick Challenge: Dial In with What You Have

Pick your current setup. For the next 5 roasts:

- Set a consistent charge temp
- Track first crack timing
- Adjust only airflow or development time
- Log everything

See how much better your coffee gets — before spending another dollar.

Coming Up: Lesson 6 — Development Time Ratio (DTR) Demystified

We'll decode:

- What development time is
- How to calculate DTR
- Why too short or too long ruins everything

SECTION 2: MASTERING ROAST DEVELOPMENT

⏱️ Lesson 6: Development Time Ratio (DTR) — The Key to Flavour

Most home roasters ruin good coffee during development — not because they go too dark, but because they don't understand how long to stay in the development phase.

That's what DTR fixes.

What is DTR?

Development Time Ratio = (Development Time / Total Roast Time) × 100

- Development Time starts the moment first crack begins
- It ends when you drop the beans (end of roast)
- Expressed as a percentage of total roast time

Why It Matters

DTR determines the balance between sweetness, body, and acidity.

DTR %	Cup Result
<15%	Underdeveloped: sour, grassy, hollow
18–22%	Balanced: sweet, clean, structured
>25%	Heavy: muted acidity, higher body, bitter risk

A study on cupping outcomes found that DTR ranges between 18–22% yielded the highest flavor clarity scores for washed Arabicas.

How to Calculate It (Example)

- First crack: 7:30
- Drop: 9:00
- Total roast time: 9:00
- Development = 1:30

  → DTR = 1.5 / 9 × 100 = 16.6%

Key Mistake: Chasing Colour Instead of Time

Roasters often drop when the bean "looks done," ignoring DTR. But colour can lie — especially with naturals or high-sugar beans.

Flavour is built during development — and it needs time.

Try This:

Do three roasts of the same bean:

- Roast A: 14% DTR
- Roast B: 19% DTR
- Roast C: 26% DTR

Cup them blind. The difference will shock you.

📉 Lesson 7: Controlling Rate of Rise (RoR) to Avoid Disaster

If DTR is your flavour window, RoR is how you drive through it.

What Is RoR?

Rate of Rise = the rate at which bean temperature increases per minute Usually expressed as °C/min or °F/min

A clean RoR = predictable roasting

A noisy RoR = chaos in the cup

The Ideal RoR Shape

Your RoR should steadily decline throughout the roast.

- Starting high (~30°C/min), declining gradually
- Avoid spikes (burning) or crashes (stalling)
- First crack RoR: ~5–10°C/min is typical for balance

Scott Rao's data-backed findings show a steadily declining RoR improves sweetness and uniformity across roast batches.

3 RoR Mistakes That Ruin Coffee

1. Spike at first crack → Over-roasted, bitter, dry finish
2. Flatline before first crack → Stalled roast, muted flavors
3. Rapid drop at charge → Inconsistent color and flavor development

RoR in Real Life: Log It

- Track your RoR at key markers (TP, 3:00, 5:00, FC)
- Adjust heat earlier — RoR is reactive, not instant

🧪 Lesson 8: The Colour Myth — Why Agtron Doesn't Guarantee Taste

Looks Can Deceive — And Often Do

You can't trust color alone. It's only surface-level development — not internal flavor.

Two beans with identical Agtron scores can taste like:

- Bright and juicy Ethiopia
- Baked and dull Peruvian

Why?

- Internal development depends on heat transfer, not just time
- Maillard and caramelization reactions may not reach equilibrium
- Colorimeters read surface light reflectance — not flavor complexity

When Colour Is Helpful:

- Comparing the same roast curve for consistency
- Identifying defects (e.g. tipping, scorching)

But don't use color to predict taste. Use it to verify replication.

Research shows visual cues alone have no statistically significant correlation with cupping scores across different origins and processes.

Test This:

Roast two batches to the same drop temperature but vary the development time:

- Cup and note sweetness, balance, body
- Then compare surface colour — it'll be similar, but the cups won't be

☕ Lesson 9: Cupping Like a Craftsman — Not a Judge

Forget the SCA scores and blindfolded rituals.

You're cupping for feedback, not for points.

Why You MUST Cup Every Roast

- Logging data without tasting is useless
- Cupping tells you if your DTR, RoR, and airflow worked
- It trains your sensory system

How to Set Up a Cupping Table at Home

- 3–5 small bowls (6oz)
- 8.25g of coffee per 150ml water (1:18 ratio)
- Freshly boiled water
- Spoon + rinse glass
- Timer

Grind medium-coarse, bloom for 4:00, break the crust, then slurp and note.

What to Look (and Taste) For

Taste Signal	Likely Roast Cause
Sour / grassy	Underdevelopment
Flat / cardboard	Stalled RoR or too long dev
Bitter / hollow	Too fast RoR after FC
Balanced / sweet	Ideal DTR + clean RoR

Build a Tasting Habit

You don't have to be a Q Grader. Just learn:

- "This tastes better than that"
- Then read your log and spot what changed

🧠 Lesson 10: The "One Variable" Rule to Learn 10x Faster

The #1 Mistake That Slows Down New Roasters

They change too many things at once.

Heat + charge temp + airflow + drop time = a soup of confusion.

You can't isolate what improved (or ruined) the roast.

The One Variable Rule:

Change only one input per roast session. Keep everything else constant.

Here's How to Apply It:

Example: Testing Development Time

Roast A

FC @ 7:30, Drop @ 8:30 → DTR = 13%

Roast B

FC @ 7:30, Drop @ 9:00 → DTR = 17%

Taste. Note the difference. Log it.

Repeat with:

- Charge temp
- Airflow setting
- Drying phase duration
- RoR shaping

Case Study: Real Progress in 3 Roasts

👤 A hobbyist using a Kaldi adjusts only:

1. Charge temp: 200°C → 190°C
2. Leaves everything else the same
3. Gains 30 seconds more Maillard

   → Cup went from sour to sweet + juicy in one adjustment

Wrap-Up: Development Is Where You Win or Waste Flavour

✅ DTR gives structure

✅ RoR gives control

✅ Cupping gives feedback

✅ Single-variable testing gives clarity

This is the engine room of flavour. Learn to use it, and you stop guessing — for good.

Next up: Section 3 — Fixing the Stuff That Ruins Your Roasts.

SECTION 2: FIXING THE ROAST BEFORE IT FAILS

🧨 Lesson 11: Burnt, Baked, or Flat — What Went Wrong?

Most failed roasts happen for one of three reasons:

You burned the surface, baked the interior, or killed the flavour arc completely.

Let's fix that — fast.

🔥 Surface Damage: Tipping & Scorching

Tipping:

Blackened edges on the ends of the bean. Usually caused by excessive radiant heat early in the roast or a high charge temp with low bean movement.

Scorching:

Dark splotches, usually from contact with an overheated drum. Happens when beans sit too long on a hot surface or air isn't moving.

Solution:

- Reduce charge temp or add a soak phase
- Improve agitation or airflow early
- Don't overload the roaster

😑 "Baked" Is Worse Than "Burnt"

Baked coffee is flat, papery, and dead.

It's caused by too slow a roast — especially during or after Maillard.

A baked roast is the most common failure for home users following "low and slow" advice — it flattens acidity and kills sweetness.

Mid-Roast Rescue Plan

- RoR crashing? Boost heat immediately pre-crack to avoid stalling
- Development dragging? Increase airflow and finish faster
- Beans not moving? Agitate or reduce load volume

Remember: small interventions early are better than overcorrections late.

🕵️ Lesson 12: Diagnosing Flavour Like a Roast Doctor

You don't need to be a Q grader.

You just need to know what you're tasting — and what caused it.

Roast Defect Guide

Flavour Problem:	Likely Cause:
Sour / grassy	Too fast to first crack, underdeveloped (low DTR)
Papery / flat	Baked — RoR stall or long dev time

Bitter / ashy	High post-crack RoR or overdevelopment
Hollow / thin	Low Maillard time, high airflow early
Juicy / sweet	Balanced DTR, stable RoR, smooth dev

When the Middle of the Curve Lies

Don't trust total roast time.

If the middle section (Maillard) stalls or races, the cup pays the price — even if crack timing looks fine.

Fix: Log > Taste > Compare

Overlay a poor-tasting roast curve next to a good one.

Where does the RoR or DTR diverge?

That's your next lever to pull.

🧾 Lesson 13: Roast Logs That Actually Teach You Something

A log without context is just numbers.

Here's how to make your logs actually valuable.

What to Capture

Pre-Roast:

- Bean type, weight, moisture, density (if known)
- Batch size
- Charge temp
- Ambient temp / humidity

During Roast:

- Turning point
- First crack time
- RoR snapshots every minute
- Airflow / heat adjustments

Post-Roast:

- Drop time / temp
- DTR %
- End batch size and weight loss%
- Cupping notes after 48 hrs
- Colour (if using Agtron/Roast Vision)

Why This Matters

Most home roasters log only temps — but the flavour is influenced by how you applied heat and when.

Your Log = Your Roasting GPS

A good log should:

- Tell you why a cup tastes like it does
- Help you fix or replicate it
- Highlight invisible variables (ambient, airflow, load)

🗺️ Lesson 14: Crafting Your Own Go-To Roast Profiles

No more guessing. You need a default profile — a roast curve you can return to and tweak from.

Why a Default Profile Works

Pros don't reinvent the curve for every bean.

They start with a baseline profile that's:

- Clean
- Clean
- Balanced
- Repeatable

From there, they push or pull variables.

How to Build It

1. Choose a washed, medium-density bean
2. Target a 10:00 total roast
3. First crack at ~8
4. Drop at ~10:00 = DTR 20%
5. Steady RoR decline
6. Log + cup

Profile by Processing

Process:	Adjustments:
Washed	Balanced RoR, clean dev
Natural	Shorter Maillard, longer dev, airflow key
Honey	Gentle heat, gradual airflow increase

Adjust by Density

High-density beans = need more energy early

Low-density = slower charge, longer soak

Now you're not just roasting — you're crafting.

SECTION 4: CONSISTENCY - FROM LUCKY TO REPEATABLE

🧭 Lesson 15: Between-Batch Protocol (BBP) — Your Secret Weapon

"My first roast was great — but the second one sucked."

That's a BBP failure. And 90% of home roasters have no idea it matters.

Why Your 2nd Roast Fails

- Drum still hot → charges at higher temp
- Exhaust not cleared → airflow changes
- Ambient temp dropped
- You rushed the reset

What Is BBP?

Between-Batch Protocol = the routine between your last roast and the next.

Your BBP Checklist

1. Cool drum to baseline temp
2. Reset airflow to pre-roast state
3. Wait for internal temps to equalize (watch ET and BT)
4. Run airflow for 1–2 min to clear smoke
5. Re-check ambient temp before loading

Research-backed BBPs improve repeatability by 20–30% for small-batch roasters.

📈 Lesson 16: Roast Pattern Recognition - The Shortcut to Mastery

You don't need a "perfect curve." You need to recognise the right patterns in your own roast history.

Most home roasters have roast logs.

Few ever go back and read them.

Fewer still know what they're looking for.

This lesson is your shortcut to unlocking consistent results — by using your past batches to guide your next ones.

🔍 What Is Pattern Recognition?

It's noticing that:

- Every natural Ethiopian you roast shines with a shorter Maillard
- Every time your RoR crashes post-crack, the coffee cups flat
- Your best cups all developed between 18–21% DTR, no matter the bean

Patterns turn logs into actionable feedback.

They help you adjust with confidence instead of guesswork.

🧭 Quick Start: Build Your Pattern Grid

1. Pick 2–3 beans you roast often
2. Find your 2 best roasts for each
3. Fill this for each:

Bean Type	Charge	FC	DTR	RoR Trend	Flavour Outcome
Natural Ethiopia.	180°C	7:10	21%	Smooth decline	Bright, sweet, floral
Brazil Natural	195°C	8:00	20%	Slight spike	Chocolate, low acid

4. Compare. Spot trends. Next roast? Start with what's worked.

🎯 What This Gives You

- A faster, smarter way to plan new roasts
- A real reason behind your best batches
- A filter to avoid repeating old mistakes

You don't need to roast from scratch every time.

You need to remember what your beans — and curves — are telling you.

Pro Tip: Color code your logbooks. Green = great. Yellow = meh. Red = fail. Flip through once a month and connect the dots.

Pattern recognition is how you go from learning to mastering.

Ready to roast smarter?

🧊 Lesson 17: Controlling Environmental Variables

You can't control the weather — but you can compensate for it.

What Wrecks Consistency

- Garage temp dropped 10°C
- Humidity jumped after a storm
- Power voltage fluctuated mid-roast
- Exhaust airflow slowed

What to Monitor

- Ambient temp (cheap indoor thermometer)
- Humidity (hygrometer)
- Voltage (Kill-A-Watt meter or wattage tracker)
- Airspeed (DIY paper strip or airflow meter)

How to Adapt

Variable	Fix
Cold ambient	Extend soak or preheat longer
High humidity	Increase airflow earlier
Low voltage	Lower batch size or extend roast time

👩‍🎨 Lesson 18: From Hobby to Craft — Building Your Roast System

Consistency doesn't come from intuition.

It comes from systems.

Your 4-Part Roasting Loop

1. Setup: Charge temp, ambient check, airflow test
2. Roast: Track key events, apply heat predictably
3. Cup: Log cupping results 24–72 hours later
4. Adjust: Change ONE thing, document, repeat

Build a Practice Routine

- Roast 3x/week — even tiny 100g test batches
- Cup side-by-side
- Keep all logs (even bad ones)

You'll go from confused to confident — batch by batch.

From Coffee Newbie to Proud

You're not guessing anymore.

You've built a system. You own your process.

And you're roasting coffee that finally lives up to your gear.