MVIII SELF · WORKBOOK 04

SYSTEMS

Systematic thinking

01 From notes to a system

02 Break it into parts

03 Make it a checklist

04 Feedback loops

05 Then what?

06 Find the bottleneck

07 Track it

08 Review and adjust

SYSTEMS · LESSON 01

From notes to a system

Linked notes as a system

> **In five minutes.** Pick three notes from this week, from different classes or meetings. On each, write one line naming another of the three and how they connect: "causes", "is an example of" or "contradicts".

THE METHOD

1. Gather 15 to 25 notes on one subject or project, from any source.
2. Write the purpose at the top of a blank page as one question this set should help answer.
3. Put each idea on its own card or line, one idea each, and give it a number.
4. Draw a line between every two ideas that connect. Label each line with a short phrase: "causes", "is an example of", "contradicts".
5. Find the ideas with the most lines and the ones with none. Give each loner a link, or set it aside.
6. Answer the purpose question in one paragraph by following a path along the lines.

REMEMBER

- **Write the purpose of the set as one question.**
- **One idea per card or line, each with a number.**
- **Join ideas with labeled lines: causes, is an example of, contradicts.**
- **Ideas with many lines are the main ones. Loners need a link or leave.**
- **Answer the question by following a path of links.**

TRY IT · 30 MINUTES

FOR A CLASS

Take this week's notes from one class. Pick 12 ideas and write each on a numbered card or line. In 15 minutes, draw every link you can see and label each with a short phrase. Circle the two ideas with the most links. Then write a paragraph answering a likely exam question by following the links out from those two. About 30 minutes.

FOR WORK AND LIFE

Take a month of notes on one project or skill: meetings, reading, your own jottings. Write the question the project most needs answered at the top of a page. Turn 10 to 15 notes into numbered single ideas and join them with labeled lines. Find the idea nothing links to and decide where it belongs. Write a one-paragraph answer by following the links.

What it looks like done

WORKED ON Chapter 1 of the Enchiridion, about 400 words, as four linked notes

THE QUESTION THIS SET ANSWERS

- What does chapter 1 ask a reader to do first when something goes wrong?

NOTE 1

- One idea, in my own words: Epictetus sorts everything into two kinds. Our own acts are in our power: opinion, desire, aversion. Body, property, reputation and office are not.
- Links to notes: 2 (is the cause behind), 3 (is the test used in)
- Source: Enchiridion 1, Long

NOTE 2

- One idea, in my own words: Treating what belongs to others as your own leads to being hindered, lamenting, and blaming gods and people.
- Links to notes: 1 (follows from), 4 (is the cost that 4 avoids)
- Source: Enchiridion 1, Long

NOTE 3

- One idea, in my own words: Faced with a harsh appearance, ask first whether it is in your power. If not, be ready to say it does not concern you.
- Links to notes: 1 (applies), 2 (is the way out of)
- Source: Enchiridion 1, Long

NOTE 4

- One idea, in my own words: Great aims take more than a small effort. Some things get left alone entirely and some get put off.
- Links to notes: 2 (explains why chasing everything fails), 9 (is an example of: my note on turning down a second project at work)
- Source: Enchiridion 1, Long

FOLLOWING THE LINKS

- 3, then 1, then 2: when something goes wrong, sort it first. If it is not mine to control, treating it as mine is what brings the blame and the lament.

CHECK YOURSELF

1. What turns a pile of notes into a system?
2. Why label a link instead of just drawing a line?
3. What does a note with no links tell you?

Answers at the back of the workbook.

Slip-box notes

NOTE NUMBER

ONE IDEA, IN MY OWN WORDS

LINKS TO NOTES

SOURCE

NOTE NUMBER

ONE IDEA, IN MY OWN WORDS

LINKS TO NOTES

SOURCE

NOTE NUMBER

ONE IDEA, IN MY OWN WORDS

LINKS TO NOTES

SOURCE

NOTE NUMBER

ONE IDEA, IN MY OWN WORDS

LINKS TO NOTES

SOURCE

SYSTEMS · LESSON 02

Break it into parts

Work breakdown structure

> **In five minutes.** Write one stalled task at the top of a page. Under it, write three parts that would finish it. Circle the one you can do in under an hour today, and start it.

THE METHOD

1. Write the whole job at the top as a finished result: "Paper on the 1918 flu, submitted" or "Team moved into the new office."
2. Under it, list the three to seven parts that together make the whole.
3. Ask of the list: if every part were done, would the whole be done? Add whatever is missing.
4. Break each part again the same way, until each piece is one sitting's work, two hours or less.
5. Name every piece as a result with a verb: "Draft section 2", not "Section 2".
6. Mark which pieces wait on others. Start with one that waits on nothing.

REMEMBER

- **Write the finished result at the top.**
- **Split into three to seven parts. Split again until each piece fits one sitting.**
- **Name every piece as a result with a verb.**
- **Check each level: if all of these were done, is the level above done?**
- **Start with a piece that waits on nothing.**

TRY IT · 25 MINUTES

FOR A CLASS

Take your next paper, project or exam. Write the finished result at the top of an outline page. Split it into four to six parts, then split each part until every piece fits one study session. Put a check by a piece that waits on nothing, and do it today. If there is time, read Descartes's four rules near the end of Part Two. About 25 minutes.

FOR WORK AND LIFE

Pick a project that has stalled: a report, a hire, a move, a repair at home. Write the finished state at the top. Break it into parts, and each part into pieces small enough for one sitting. Give every piece a verb. Then test each level: if all of these were done, would the level above be done? Each no is a missing piece.

What it looks like done

WORKED ON Moving to a new apartment by the end of the month

TOPIC

- Moved into the new apartment by the 30th, with every account at the new address.

I. PACKING DONE BY THE 27TH

- A. Supplies
- 1. Pick up 20 boxes from the grocery store, Saturday
- 2. Buy tape and two markers
- B. Pack room by room
- 1. Books and winter clothes, this week
- 2. Kitchen last, on the 28th

II. MOVING DAY BOOKED

- A. Reserve the van for the 29th
- B. Ask two friends to help, and confirm by text on the 25th

III. ADDRESSES CHANGED

- A. Bank, phone, payroll at work
- B. Mail forwarding
- C. Renter's insurance at the new address

IV. OLD PLACE HANDED BACK

- A. Clean and photograph each room
- B. Return the keys and ask about the deposit

CHECK AGAINST THE TOPIC

- If I to IV were all done, would the move be done? No. Nothing covers internet at the new place.
- Added III. D. Schedule the internet install for the 30th.
- First piece that waits on nothing: I. A. 1, the boxes.

CHECK YOURSELF

1. When do you stop breaking a piece down?
2. Why test each level against the one above it?
3. Why name each piece as a result with a verb?

Answers at the back of the workbook.

An outline

TOPIC

I.

- A.
  - 1.
  - 2.
- B.
  - 1.
  - 2.

II.

- A.
  - 1.
  - 2.
- B.
  - 1.

III.

- A.
- B.
  - 1.
  - 2.

IV.

- A.
- B.

SYSTEMS · LESSON 03

Make it a checklist

Checklist

> **In five minutes.** Think of the last time a routine went wrong. Write the step that got missed on a sticky note, and put the note where the routine starts: the front door, the laptop, the folder.

THE METHOD

1. Pick one routine you repeat where a skipped step costs something: a lab write-up, a weekly report, packing for a trip.
2. List every step. Cross out the ones no one ever forgets. Keep the steps that are easy to skip and costly to miss.
3. Cut the list to five to nine lines, each a short check: "Data table attached."
4. Choose the pause point, the moment the list gets read: before uploading, before leaving, before the meeting starts.
5. Choose the style. Read each line and then do it, or do the work from memory and read the list after to confirm.
6. Use it five times. Cut lines that never catch anything, and add any step that was missed.

REMEMBER

- **List the steps that are easy to skip and costly to miss. Leave out the rest.**
- **Five to nine lines, each a short check.**
- **Set one pause point when the list gets read.**
- **Read and do, or do from memory and read to confirm.**
- **After five uses, cut lines that catch nothing. Add what was missed.**

TRY IT · 20 MINUTES

FOR A CLASS

Write a submission checklist for your next lab report, problem set or essay. Go through the assignment sheet and the comments on your last graded piece. Keep five to nine lines that are easy to miss: a rubric item, the citation style, the file name, the page limit. Set the pause point as the minute before you upload. Use it on this assignment and the next. About 20 minutes.

FOR WORK AND LIFE

Pick a routine that has gone wrong before: a weekly report, a handoff to a client, closing up a shop, leaving for a work trip. Write five to nine lines for the steps that get skipped. Decide when it gets read and who reads it. With two people, one reads each line aloud and the other confirms. Use it for two weeks, then cut and add.

What it looks like done

WORKED ON Two routines: uploading a lab report for an introductory chemistry course, and leaving for a two-day work trip

WHAT THIS CHECKLIST IS FOR

- Lab report. Read at the pause point, the minute before uploading. Do the work from memory, then read the list to confirm.

CHECKLIST

- Units on every column of the data table
- One sample calculation shown for each formula
- Error analysis paragraph included
- Figures numbered, with captions
- Citations in the course's required style
- File named Lastname_Lab4.pdf
- Under the six-page limit

WHAT THIS CHECKLIST IS FOR

- Leaving for the trip. Read at the front door, each line read and then done.

CHECKLIST

- ID in the bag
- Laptop, charger and badge
- Medication for the trip plus two days
- Stove off, back door locked
- Trash out

AFTER FIVE USES

- Lab list: "Figures numbered" never caught anything. Cut it. Lab 3 lost points for a missing title page. Added "Title page with section number".

CHECK YOURSELF

1. Why leave the easy steps off a checklist?
2. What does the pause point do?
3. Why did checklists help in some hospitals and not others?

Answers at the back of the workbook.

SYSTEMS · LESSON 03 · PRACTICE

A checklist

WHAT THIS CHECKLIST IS FOR

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

Feedback loops

Stocks, flows and feedback loops

> **In five minutes.** Pick one thing that piles up: an inbox, laundry, a reading list. Write how much came in this week and how much went out. If more came in, the pile grew. Write one change to the outflow.

THE METHOD

1. Name the stock: one quantity that builds up or drains, such as savings, unread pages or sleep debt. Draw it as a box.
2. Draw each inflow as an arrow into the box and each outflow as an arrow out. Give each a rate: "$200 a week in", "3 articles a day in".
3. Ask what sets each flow. Where the size of the stock changes a flow, draw an arrow from the box back to that flow.
4. Label each loop. R for reinforcing, where more leads to more. B for balancing, where more leads to less.
5. Mark any delay on an arrow, where a change now shows up days or weeks later.
6. Pick one flow to change. Write which way the stock will move, and how fast.

REMEMBER

- **A stock builds up or drains: savings, a backlog, sleep debt.**
- **It changes only through its inflows and outflows.**
- **R loop: more leads to more. B loop: more leads to less.**
- **Mark the delays. Stocks move slower than flows.**
- **Change one flow, then predict the stock.**

TRY IT · 20 MINUTES

FOR A CLASS

Pick a course where work piles up: readings, problem sets, lab write-ups. Draw the backlog as a box. Write the inflow as assignments per week and the outflow as what you finish per week. Add one loop: what happens to the outflow as the box grows? Label it R or B. Then write the change that makes the outflow beat the inflow, and how many weeks the box takes to clear. About 20 minutes.

FOR WORK AND LIFE

Draw one stock from your own week: a savings balance, an inbox, sleep, a queue of requests at work. Put a number on each inflow and outflow. Find one loop that makes it grow or shrink faster, and one that holds it steady. Mark any delay. Write which flow you could change this week, and what the stock should look like a month from now.

What it looks like done

WORKED ON A reading backlog in a semester-long history course

THE THING THAT BUILDS UP OR RUNS DOWN

- Unread pages for History 201. 180 pages behind on Sunday night.

WHAT FLOWS IN

- About 90 pages assigned a week.

WHAT FLOWS OUT

- About 60 pages read a week, most of it on Sunday night.

WHAT FEEDS BACK

- R: the bigger the pile, the more a 20-minute session feels pointless, so less gets read. More behind, less read.
- B: the bigger the pile, the more the Friday quiz looms, so Thursday reading jumps. This keeps the pile from running away.
- Delay: quizzes come every two weeks, so the push from B arrives late.

THE LOOP, IN A SENTENCE

- The pile grows by 30 pages a week, and the R loop wins until a quiz forces a catch-up.
- Change: 25 pages after each of the four class meetings makes the outflow 100. The pile shrinks by 10 a week, so 180 pages take 18 weeks.
- Add 40 pages on Sundays for a month. The pile shrinks by 50 a week and clears in about four weeks.

CHECK YOURSELF

1. Can a stock rise while its inflow is falling?
2. What is the difference between a reinforcing loop and a balancing loop?
3. Why mark delays on the map?

Answers at the back of the workbook.

SYSTEMS · LESSON 04 · PRACTICE

A loop map

THE THING THAT BUILDS UP OR RUNS DOWN

DRAW IT: WHAT FLOWS IN, WHAT FLOWS OUT, AND WHAT FEEDS BACK

THE LOOP, IN A SENTENCE

SYSTEMS · LESSON 05

Then what?

Second-order thinking

> **In five minutes.** Take one choice you are making this week. Write its first effect. Ask "then what?" twice and write each answer. Then write one thing the choice will use up.

THE METHOD

1. Write the choice in one line: "Start the essay the night before" or "Require sign-off on every expense over $50."
2. Write the first effect, the one everyone expects.
3. Ask "then what?" of that effect and write the answer. Ask again of the answer, three or four times.
4. Beside each effect, note who or what it lands on, and when: this week, next month, next year.
5. Ask what stops happening because of the choice: the money, time or attention it uses up.
6. Read the whole chain, then decide. Keep the choice, change it, or add a step that heads off a later effect.

REMEMBER

- **Write the choice, then the first effect everyone expects.**
- **Ask "then what?" of each effect, three or four times.**
- **Note who each effect lands on, and when.**
- **Ask what stops happening: the unseen cost.**
- **Keep the choice, change it, or add a step that heads off a later effect.**

TRY IT · 20 MINUTES

FOR A CLASS

Pick a study habit you are weighing: an all-nighter before an exam, recorded lectures in place of live ones, a study group. Write the first effect. Ask "then what?" four times and write each answer, with when it shows up. Then write what the choice uses up that could have gone elsewhere. Circle any effect that arrives after the grade is in. About 20 minutes.

FOR WORK AND LIFE

Take a rule or change on the table at work or at home: a new approval step, a cut to the household budget, a standing meeting moved to Monday mornings. Run the chain four links out. For each link, note who it lands on and when. Add the unseen cost: what stops happening. Bring the chain to the decision, with one small change that heads off the worst later effect.

What it looks like done

WORKED ON A proposal at a small office: manager sign-off on every purchase over $50

THE DECISION, AND THE DATE

- Require manager sign-off on every purchase over $50. Proposed November 3.

WHAT I EXPECT TO HAPPEN

- First effect: fewer small purchases, and supply spending drops.
- Then what? Requests queue for the manager. Orders that took a day now take three or four.
- Then what? People split one $80 order into two $40 orders to skip the queue.
- Then what? Total spending falls less than hoped, and the manager spends about two hours a week on approvals.
- Unseen: those two hours come out of the manager's planning time.

WHY

- Each link follows from people taking the fastest route to what they need for their work.

WHAT I'M UNSURE OF

- Whether splitting orders would really happen here, and how much a three-day wait slows real work.

A YEAR FROM NOW IT FAILED. THE LIKELIEST REASONS

- The queue slowed everyone down, and split orders kept spending flat.
- Change to bring to the meeting: set the limit at $200 and review monthly totals by team.

CHECK YOURSELF

1. Why ask "then what?" more than once?
2. What is the unseen cost of a choice?
3. When should the chain stop?

Answers at the back of the workbook.

SYSTEMS · LESSON 05 · PRACTICE

A decision page

THE DECISION, AND THE DATE

WHAT I EXPECT TO HAPPEN

WHY

WHAT I'M UNSURE OF

A YEAR FROM NOW IT FAILED. THE LIKELIEST REASONS

REVIEW ON (DATE). WHAT HAPPENED

SYSTEMS · LESSON 06

Find the bottleneck

Theory of constraints

> **In five minutes.** Write the steps of your weekday morning in order. Beside each, mark where you usually end up waiting. That step is the bottleneck. Tomorrow, change one thing about that step and nothing else.

THE METHOD

1. Write the steps of the process in order, from the start to the finished result.
2. Beside each step, write how much it can handle in a day, and how much is waiting in front of it.
3. Find the bottleneck: the step with the least capacity, usually the one with the biggest pile waiting.
4. Get the most from it. Keep it from sitting idle, and move off it any work another step could do.
5. Pace every other step to it. Producing more upstream only grows the pile.
6. If it is still too slow, add capacity there. Then look again, because the bottleneck may have moved.

REMEMBER

- **List the steps in order, with what each can handle per day.**
- **The bottleneck is the slowest step, usually with the biggest pile.**
- **Protect its time. Move other work off it.**
- **Pace every other step to it.**
- **Days of waiting: items waiting divided by items finished per day.**

TRY IT · 20 MINUTES

FOR A CLASS

Write out how one problem set or lab report goes from assigned to submitted: reading, notes, problems, checking, writing up, submitting. Beside each step write how long it takes and what tends to wait in front of it. Circle the slowest step. Write one change that protects its time, such as doing it first while fresh. Time the next assignment and compare. About 20 minutes.

FOR WORK AND LIFE

Map a weekly process with handoffs: a report, a hiring loop, the weekday morning at home. List each step, who does it, and how much it can handle per day. Count what is waiting before each step. Divide what is waiting by what gets finished per day to get days of waiting. Pick one change at the bottleneck only, and measure the whole process again a week later.

What it looks like done

WORKED ON A weekly sales report that goes out late most Fridays

THE PROCESS, START TO FINISH

- Five team members send their numbers, all 8 sections in by Wednesday noon.
- The analyst cleans the numbers and builds the charts: 2 sections a day.
- The manager reviews all 8 sections in about an hour.
- Due Friday at 3 p.m.

WAITING BEFORE IT

- Sections pile up in front of the analyst. All 8 arrive at once, and 2 go out a day.
- 8 waiting at 2 a day is about 4 days. Wednesday noon to Friday 3 p.m. is about 2.5 working days. Late.
- The manager's hour never has a queue. Speeding up the review would change nothing.

THE BOTTLENECK, AND ONE CHANGE TO TRY

- The bottleneck is the analyst's cleanup.
- Each sender cleans their own numbers before sending. The analyst now builds 3 sections a day, so 8 take under 3 days.
- Senders send by Tuesday noon, so the queue starts a day earlier.
- A late report meant a Friday rush, errors, and rework next week. Moving the cleanup off the analyst's desk breaks that loop.

CHECK YOURSELF

1. Why does speeding up a step that is not the bottleneck change nothing?
2. How can you spot the bottleneck without timing every step?
3. Why look again after fixing it?

Answers at the back of the workbook.

SYSTEMS · LESSON 06 · PRACTICE

A process map

THE PROCESS, START TO FINISH

STEP	TIME IT TAKES	WAITING BEFORE IT	PILES UP HERE?

THE BOTTLENECK, AND ONE CHANGE TO TRY

SYSTEMS · LESSON 07

Track it

Franklin's virtue chart

> **In five minutes.** Tonight, write three things you are working on down the side of a page and the seven days across the top. Before bed each night this week, mark each row that slipped that day.

THE METHOD

1. Choose three to five things you are working on. Write each as a short rule a day either keeps or misses: "In bed by 11", "Read before lecture".
2. Rule a page with those rows down the side and the seven days across the top.
3. Each evening, take one minute. Put a mark in the row of each rule that slipped that day.
4. Give one row the main attention each week, as Franklin did, and let the others simply be recorded.
5. At the end of the week, count the marks in each row and look at which days carry them.
6. Keep, change or drop each row for next week. A rule that never slips can come off the chart.

REMEMBER

- **Three to five rows, each a rule a day keeps or misses.**
- **Seven columns, one for each day.**
- **One minute each evening: mark the rows that slipped.**
- **One row gets the main attention each week.**
- **At the week's end, count the marks and look for the days they share.**

TRY IT · 10 MINUTES

FOR A CLASS

Pick three study habits for one course this week: read before lecture, review notes the same day, start the problem set by Wednesday. Rule a chart with those rows and the seven days. Each evening, mark the rows that slipped. On Sunday, count the marks and write one line on what the marked days had in common. Five minutes to set up, a minute each night. If there is time, read Franklin's own account in chapter 9.

FOR WORK AND LIFE

Choose three to five things you are working on at work or at home: no email before the first task, a walk at lunch, phones away at dinner, in bed by 11. Rule a weekly chart. Mark slips each evening in under a minute. At the end of the week, find the day with the most marks and write what was different about it.

What it looks like done

WORKED ON One week of a chart kept by someone working full time and taking an evening class

WORKING ON

- In bed by 11: slipped Mon, Thu, Sat. 3 marks.
- Phone out of the bedroom: slipped Mon, Thu. 2 marks.
- Class reading done before Tuesday's lecture: slipped Tue. 1 mark.
- Lunch away from the desk (this week's main row): slipped Mon, Thu. 2 marks, down from 5 last week.
- Ten minutes of review after class: slipped Thu. 1 mark.

WHAT THE MARKS SHOW

- Monday and Thursday carry 7 of the 9 marks. Both days have a 4 p.m. meeting, and Thursday has class at 6.
- Late nights fall on the same nights the phone stayed in the bedroom.

NEXT WEEK

- Keep the lunch row. It is working.
- Main row next week: phone out of the bedroom, since the late nights follow it.
- Move Thursday's review to the train ride home.

CHECK YOURSELF

1. Why mark slips each evening instead of once at the end of the week?
2. Why give one row the main attention each week?
3. In the research, what made monitoring progress help more?

Answers at the back of the workbook.

SYSTEMS · LESSON 07 · PRACTICE

A weekly chart

One row for each thing you are working on. A mark for each day it slipped.

WORKING ON	S	M	T	W	T	F	S

Review and adjust

After-action review

> **In five minutes.** Tonight, write four lines about today: what you meant to do, what happened, why the two differed, and one thing to keep or change tomorrow.

THE METHOD

1. Set a time within a few days of the event, or at the end of each week. Bring everyone who took part, or just yourself.
2. Write what was supposed to happen: the goal, the plan, the standard.
3. Write what actually happened, as facts in order, before any judging.
4. Ask why the two differed. Ask it of what went well, as well as what went wrong.
5. Pick one thing to keep and one to change. Write each as a step for next time, with a date.
6. Put the steps where the next plan gets made: the calendar, the checklist, the weekly chart.

REMEMBER

- **What was supposed to happen?**
- **What actually happened, in order?**
- **Why did they differ? Ask it of the good parts too.**
- **One thing to keep, one to change, each as a dated step.**
- **Put the steps on next week's calendar or checklist.**

TRY IT · 20 MINUTES

FOR A CLASS

When your next exam or graded assignment comes back, take 15 minutes. Write what you planned to do to prepare, what you actually did, and what the grade and comments show. For each gap, write why. Then write one study step to keep and one to change for the next exam, each with a date on your calendar.

FOR WORK AND LIFE

At the end of this week, take 20 minutes with the review page. What did the week plan to do? What happened, day by day? Where did it slip, and why? Use the course: one loop that ran, one bottleneck, one checklist line that would have caught a miss. Pick one change and put it on next week's calendar.

What it looks like done

WORKED ON One week for someone working full time and taking an evening statistics class

THE WEEK OF

- November 9 to 15.

WHAT I LEARNED

- Statistics: a 95% confidence interval comes from a method that captures the true value in about 95% of samples. It is not a 95% chance for this one interval.
- Work: the client reads only page one, so the summary goes there.

WHAT I'LL TEST MYSELF ON

- Write the confidence interval formula from memory, and explain what 95% means in one sentence.

NOTES TO CONNECT OR REWRITE

- Link the confidence interval note to last week's note on sampling error (is the next step after).

WHAT SLIPPED, AND WHAT I'LL CHANGE

- Planned: three study sessions. Happened: one, on Sunday.
- Why: Tuesday and Thursday sessions sat after a 6 p.m. meeting, and the reading pile kept growing.
- Bottleneck: Thursday evening. Change: move one session to Saturday morning.
- Keep: the 15-minute review on the train after class worked both nights.

NEXT WEEK

- Saturday 9 a.m.: statistics problem set at the library.
- Add "summary on page one" to the client report checklist.

CHECK YOURSELF

1. Why write what happened before asking why?
2. Why review what went well, not only what went wrong?
3. What makes a review change the next week?

Answers at the back of the workbook.

SYSTEMS · LESSON 08 · PRACTICE

A review page

THE WEEK OF

WHAT I LEARNED

WHAT I'LL TEST MYSELF ON

NOTES TO CONNECT OR REWRITE

WHAT SLIPPED, AND WHAT I'LL CHANGE

NEXT WEEK

Check yourself: answers

LESSON 01 · FROM NOTES TO A SYSTEM

1. **What turns a pile of notes into a system?** Three things: the notes as parts, the links between them, and a purpose question they help answer. Without the purpose, links multiply and say nothing.
2. **Why label a link instead of just drawing a line?** A bare line says two ideas relate. A label says how: causes, is an example of, contradicts. Choosing the label is a decision about the relationship, and that decision is what gets learned.
3. **What does a note with no links tell you?** Either its link has not been found yet, or it does not serve this question. Give it a link or set it aside. An unlinked note is rarely found again.

LESSON 02 · BREAK IT INTO PARTS

1. **When do you stop breaking a piece down?** When it fits one sitting and the first move is obvious. Descartes's second rule holds the same limit: as many parts as the solution needs, and no more.
2. **Why test each level against the one above it?** Splitting can drop a piece into the cracks. Asking whether all the parts would finish the whole catches the missing bibliography or change of address before the deadline does.
3. **Why name each piece as a result with a verb?** "Section 2" leaves the action open every time you look at it. "Draft section 2" says what to do, and how to tell when it is done.

LESSON 03 · MAKE IT A CHECKLIST

1. **Why leave the easy steps off a checklist?** A long list gets skimmed, and the lines that matter drown. A checklist holds the steps that are easy to skip and costly to miss. Skill and habit handle the rest.
2. **What does the pause point do?** It fixes the moment the list gets read, so reading it becomes part of the routine. A list without a set moment gets read when someone remembers, which is rarely when it is needed.
3. **Why did checklists help in some hospitals and not others?** Results tracked how the lists were used. In Michigan, units wrote their own and nurses could stop a procedure. In Ontario, adoption under a policy showed no significant change.

LESSON 04 · FEEDBACK LOOPS

1. **Can a stock rise while its inflow is falling?** Yes. A stock rises whenever the inflow is larger than the outflow, even while the inflow shrinks. Reading the stock from the shape of the flow is the common mistake.
2. **What is the difference between a reinforcing loop and a balancing loop?** In a reinforcing loop, more leads to more, so change speeds up. In a balancing loop, more leads to less, so the stock gets pulled back toward a level.
3. **Why mark delays on the map?** A change made now may show in the stock weeks later. With the delay unmarked, a change that works can look like a failure and get dropped too soon.

LESSON 05 · THEN WHAT?

1. **Why ask "then what?" more than once?** The first effect is the one everyone already sees. The effects that cost or help the most often come second or third, later and somewhere else.
2. **What is the unseen cost of a choice?** What stops happening because of it. Bastiat's shopkeeper pays the glazier six francs, and the shoes he would have bought never appear.
3. **When should the chain stop?** At about four or five links, or wherever you can no longer say why one effect follows from the last. Past that point, guessing outruns knowing.

LESSON 06 · FIND THE BOTTLENECK

1. **Why does speeding up a step that is not the bottleneck change nothing?** The chain finishes only as fast as its slowest step. Faster work before the bottleneck waits in its queue, and steps after it wait for its output.
2. **How can you spot the bottleneck without timing every step?** Look for the biggest pile of work waiting. Work stacks up in front of the slowest step.
3. **Why look again after fixing it?** Once the slowest step speeds up, another step becomes the slowest. The bottleneck moves, so the check repeats.

LESSON 07 · TRACK IT

1. **Why mark slips each evening instead of once at the end of the week?** By Sunday the week has blurred. An evening mark records the day while it is still clear, and a row of days shows which ones slip and what they share.
2. **Why give one row the main attention each week?** Franklin found that guarding one fault left him open to another. Focusing on one row while the rest are only recorded keeps the effort small enough to keep up.
3. **In the research, what made monitoring progress help more?** Writing the information down, and reporting it to others or making it public. How often people monitored also explained much of the benefit.

LESSON 08 · REVIEW AND ADJUST

1. **Why write what happened before asking why?** Judging first bends the facts toward a story. Laying out the plan and the events in order makes the gap visible, so the why can be about the gap.
2. **Why review what went well, not only what went wrong?** In one study, soldiers who reviewed successes as well as failures improved more than those who reviewed only failures. What worked is also something to keep on purpose.
3. **What makes a review change the next week?** A step with a date, put where the next plan is made: the calendar, the checklist, the chart. A lesson that stays in the review notes rarely gets used.