Badji Mokhtar University, Annaba | Common Core, Sciences of Matter (L1)

Discovery of University Working Methods

Chapter 3: Note-Taking

Course Summary

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Learning objectives

By the end of this chapter, you should be able to:

- listen for the plan of a lecture and decide what to write and what to leave;
- choose, build and combine the three layout methods (linear, two columns, mapping);
- take notes adapted to physics and chemistry (formulas, units, proofs, diagrams);
- build a personal abbreviation system that follows the four rules of a good system;
- rework, classify and store your notes, then reuse them for revision, summary sheets and reports.

Where this chapter fits: Chapter 1 taught you to **find** documents, Chapter 2 to **read** them, Chapter 3 teaches you to **capture and keep** what you hear and read. Chapter 4 will teach you to **write**.

1 Listening for the Plan, Not for the Words

Every lecture has a skeleton, and your notes must show it. **The reflex of the first minute:** when the teacher announces the plan, write it immediately and leave space under each title. Your page is then organised before the lecture really begins.

The teacher says...	It means...	In your notes...
"Today we will see three points"	the whole plan	Write the 3 titles at once
"First of all..."	a new part begins	**New line**, big title
"That is to say..."	he reformulates	Nothing to add
"Consequently..."	a conclusion arrives	**Underline**
"Be careful..."	a frequent mistake	**Frame it**
"We shall see next week"	the part is finished	Close the section

What to write and what to leave

ALWAYS WRITE ✓	DO NOT WRITE ✗
the plan and the titles; definitions and laws; formulas and their conditions; numerical values and units; diagrams; what the teacher repeats; what he writes on the board	connecting words and politeness; repetitions and reformulations; anecdotes and jokes; long examples (a keyword is enough); what is already in your textbook; complete sentences

The signals of the teacher

"This is important" • "Remember that" • "I insist" • a slower voice • something written on the board ⇒ these are the moments to write **without hesitation**.

2 Three Methods for Laying Out Your Notes

A *method* answers one question: **how will my page be organised?** The teacher speaks at about 150 words per minute and you write at about 25, so the layout must let you keep only the ideas, in the right place, without thinking about it. Three methods are taught. They do not compete: each one has a moment where it is the best tool.

Method 1: the structured linear plan

Example page: Thermodynamics, 12/10/2026

I. FIRST PRINCIPLE
1. Statement
   - energy conserved in isolated syst.
   - $\Delta U = Q + W$
2. Conventions
   - $Q > 0$ received / $Q < 0$ given

II. APPLICATIONS
1. Isothermal transf.
   - $\Delta U = 0 \Rightarrow Q = -W$

Careful: valid only if P constant

Principle. Indentation shows the hierarchy: the further right, the more detailed.
1. First minute: write the main parts as **I., II.** and leave space under each.
2. Sub-parts **1., 2.** one step to the right.
3. Details (definitions, formulas, values) as **bullets**, one more step to the right.
4. Mark the teacher's signals: underline a conclusion, frame a warning.

Strengths: simple, fast, natural; suits a well-structured lecture.
Limits: shows badly the *links* between distant ideas.
Pitfall: more than three levels of indentation. Beyond that the page becomes a staircase and you spend your time choosing the level instead of listening.

This is the recommended method for L1: it works in a fast amphitheatre lecture, and your page is already organised the moment the lecture ends.

Method 2: the two-column method

Example page after rework

KEYWORDS	NOTES OF THE LECTURE
1st principle	Energy of an isolated system is conserved. $\Delta U = Q + W$
Conventions	$Q > 0$ if received by the system, $Q < 0$ if given
Question?	And for an open system? $\rightarrow$ ask the teacher

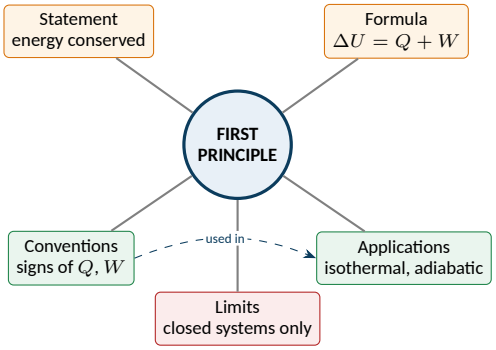
SUMMARY: Energy is never created; it is exchanged as heat or work.

Principle. The page is cut into a wide **right column** (the lecture), a narrow **left column** (your keywords and questions) and a **summary** band at the bottom. It is used in three moments:
1. **During** the lecture: write only in the right column.
2. **Within 24 hours**: fill the left column with one keyword or question per block of notes, then write the 2–3 line summary.
3. **When revising**: hide the right column and explain each keyword aloud. Your notes become an examination.

Strengths: built-in revision tool; forces you to find the key idea of each block.
Limit: needs the preparation of the page and the rework afterwards.

What goes in the left column? A good keyword is a *question in disguise*: if you cannot explain it from memory, the notes in front of it are not yet yours. Use three kinds of entries: a **keyword** ("conventions"), a **question for the teacher** ("open system?") and a **formula to know by heart**.

Method 3: mapping



Principle. The notion sits at the **centre**; the ideas that depend on it are placed **around** it and joined by lines.
1. Write the notion in the centre.
2. One branch per main idea (statement, formula, conventions...), one colour per type.
3. Add short details at the end of each branch.
4. Draw an **arrow** between distant ideas that are linked (dashed arrow above): this is what the linear plan cannot show.

One chapter, one page.

When is it excellent? To revise and see a whole chapter on one page, for a disorganised lecture, and for people with a strong visual memory. **When is it dangerous?** Live and at high speed: you run out of space and lose the order of the lecture.

Which method for which situation?

Situation	Linear	Two columns	Mapping
Fast lecture in amphitheatre	**best**	good	difficult
Well-structured lecture	**best**	good	possible
Reading a document calmly	good	**best**	good
Revising before an exam	average	**best**	**best**
Summarising a whole chapter	no	average	**best**

Combine the three methods: a workflow for this year

Live: linear or two columns → **within 24 h:** rework, margin keywords, 3-line summary → **end of the chapter:** one mapping page to summarise it. There is no "best method" in absolute terms, only the one you actually use.

3 Prepare Your Page Before the Teacher Speaks

Five habits make the difference:

1. **Title the page**: module, chapter, **date**, page number (e.g. *PHYSICS 1 — Ch. 3 First principle — 12/10/2026 — p. 1*).
2. Write on **one side** of the sheet only.
3. Keep a **wide margin** on the left, empty. It receives what does not exist yet: your questions, the teacher's additions, your revision keywords.
4. Leave **air**: skip lines between ideas, one idea per line, and 3–4 empty lines at the bottom.
5. Use two colours: black for the content, **one colour** for titles and warnings.

4 Note-Taking in Physics and Chemistry

Object	What you must absolutely note
A definition	The exact wording. **Here, copying is allowed.**
A law, a formula	The formula **and** its **conditions of validity**.
A demonstration	The starting point, the key steps, the result. Not every line.
A numerical application	The data, the formula used, the result **with its unit**.
A diagram, a scheme	Draw it **immediately**, even badly: a diagram is never recovered later.
An experiment	Apparatus, quantity measured, expected result.

Noting a demonstration without copying it

What students write	What you should write
Twenty lines of algebra copied exactly, with no word of text. At home: "why this step?" and nothing answers.	**Start:** $\Delta U = Q + W$ → *we suppose* V *constant* **So** $W = 0$ → *therefore* $\Delta U = Q_V$ **Result:** at constant volume, heat = variation of internal energy

Two absolute rules of our disciplines

1. A symbol without its **unit** is useless. **2.** A formula without its **conditions of validity** is a future mistake in the exam.
What matters in a proof is not the algebra but the **hypotheses** and the **passages**: the calculation can be redone at home, the reason cannot be invented.

Lecture notes versus reading notes

	Lecture notes	Reading notes
Rhythm	imposed, very fast	chosen, you control it
Return possible	no	yes, as often as needed
Main risk	to miss, to write badly	to copy the document
Reference to note	module, chapter, date	author, title, page
Status	**raw material**: must be reworked afterwards	**finished product**: written slowly, in your own words

5 Abbreviations: Writing Faster Without Losing Meaning

Even with a perfect method you still write six times slower than the teacher speaks. Good abbreviations raise your speed to about **40–50 words per minute**, twice as much. What you gain is not paper but **attention**: time saved by the hand is given to the head, so you understand while you write.

Four ways to shorten a word

Technique	Principle	Examples
1. Cut the end	keep the beginning	temp. (temperature), exp. (experiment), dev. (development)
2. Remove the vowels	keep the skeleton	pb (problem), dvpt (development), mvt (movement)
3. Initials	for long expressions	1st P. (first principle), c.o.m. (centre of mass), TP (practical work)
4. Symbols (best)	written in one gesture, read instantly, in any language	$\rightarrow$ leads to; $\neq$ different from; $\uparrow$ increases

You already know half the system

Mathematics and chemistry have given you a ready-made abbreviation system. Use it in ordinary sentences too.

Symbol	Means	Symbol	Means
$\rightarrow$	leads to, gives	$\uparrow\downarrow$	increases / decreases
$\Rightarrow$	therefore, implies	$\approx$	approximately equal
$\Leftrightarrow$	equivalent to	$\propto$	proportional to
$\neq$	different from	Δ	variation of
$\forall$	for all	$\gg \ll$	much greater / smaller
$\exists$	there exists	$\sum$	sum of
$\therefore$	consequently	∞	infinite, very large

Example: "If the thickness decreases, the conductivity decreases" becomes $e\downarrow \Rightarrow\ \kappa\downarrow$ (nine words become five signs).

A starting kit for physics and chemistry

Abbr.	Word	Abbr.	Word	Abbr.	Word
syst.	system	T	temperature	**ex.**	example
exp.	experiment	P	pressure	**déf.**	definition
mes.	measurement	V	volume	**cf.**	see, refer to
éq.	equation	ρ	density	**nb.**	number
prop.	property	λ	wavelength	**gd / pt**	great / small
réact.	reaction	**cst**	constant	**ds**	in
cond.	condition	**th.**	theorem	**pcq**	because

Warning: *sol.* may mean solution or solid, T may mean temperature or time. Inside one module, one abbreviation must have **one meaning only**.

The same idea, written twice

In full (38 words, about 90 seconds): "When the temperature of the system increases, the speed of the chemical reaction increases as well, because the number of effective collisions between the molecules becomes greater. This is valid only if the pressure remains constant."

In notes (one line, about 12 seconds): $T\uparrow \Rightarrow\ v_{\text{réact.}}\uparrow$ pcq nb. collisions eff. $\uparrow$ cond.: $P = \text{cst}$

Nothing scientific is lost: the cause and the condition of validity are both there. Only the grammar disappeared.

The four rules of a good system

A system is good when you can read it *without thinking*, a month later. Four rules guarantee this.

Rule	Why it matters	How to apply it	Bad → good
STABLE	If a sign changes meaning, rereading becomes guessing.	One abbreviation = one meaning inside a module. New signs are invented **after** the lecture, never during.	***sol.*** = solution on Monday, solid on Tuesday → *sol.* = solution, *solid* written in full; T temperature, t time.
PERSONAL	A friend's system must be translated; yours is read automatically.	Start from what you already write naturally and from the maths and chemistry symbols you know. Do not copy a table.	Copying a friend's *dvpt*, *mvt*, *pcq*...and hesitating on each → keep only the ones you would have invented.
LIMITED	Beyond 20–30 entries you forget some and lose more time decoding than you save.	Aim at **20 entries**: 10 frequent words, 5 logical links, 5 symbols. Remove any entry you never use.	60 abbreviations, half of them forgotten → 20 you know by heart.
WRITTEN DOWN	An abbreviation that is not written down exists only in your head, and disappears.	Copy the table on the **first page** of your notebook. Add new entries after each lecture and cross out the bad ones.	Abbreviations scattered on the pages → one table, one place, always at hand.

Build your own table in four steps

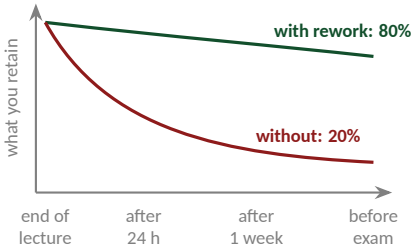
1. **Collect:** for one week, underline the words you write most often in Physics and Chemistry.
2. **Shorten:** choose the technique for each word (cut the end, remove the vowels, initials, **symbol first**).
3. **Check:** does any abbreviation have two meanings? Can you read all of them *without* the table?
4. **Fix:** write the 20 entries on the first page; add to it only after a lecture.

The test that never fails: reread notes taken one month ago. If you hesitate on an abbreviation, it is a bad one, so replace it.

When abbreviating becomes dangerous

- Never abbreviate a **definition** (write it in full), a **unit** (SI units are already symbols) or a **condition of validity**.
- Keep the **logical link** (→, ⇒, pcq): a sentence with no verb and no link is lost.
- Notes so compressed that you no longer understand them are worse than no notes: they give you the *illusion* of possessing the lecture.

6 The Rework: 15 Minutes Within 24 Hours



1. **Complete** what is missing, while you still remember.
2. **Correct** unreadable abbreviations and wrong signs.
3. **Title and date**: module, chapter, date, page number.
4. **Fill the margin**: keywords and questions.
5. **Write a 3-line summary** at the bottom of the page.
6. **Mark in red** what you did not understand, to ask next time.

Cost and benefit: 15 minutes of rework give notes usable for three years; without it, the same notes become unreadable in three weeks. **Raw notes are a draft; the rework turns them into a document.**

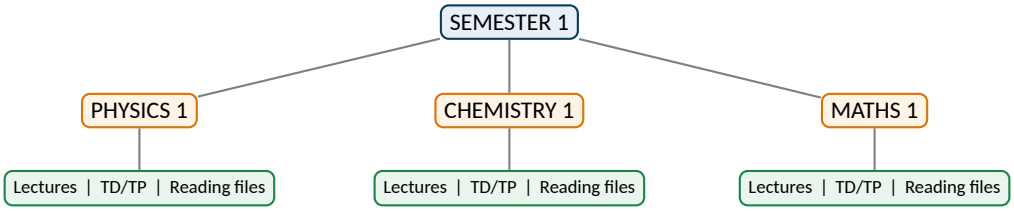
Six mistakes that ruin good notes

✗	The mistake	The consequence
1	Trying to write **everything**	You understand nothing during the lecture
2	**No date**, no title on the page	Notes impossible to classify
3	Writing **edge to edge**, no space	Nothing can be added later
4	Skipping the **diagrams**	The most valuable part is lost
5	**Never rereading** the notes	About 80% forgotten in one week
6	Photographing the board **instead** of writing	The image is stored; the idea is not

A photo of the board is useful *in addition* to your notes (to check a long formula), but disastrous *instead of* them: photographing is not thinking.

7 Classifying and Storing Your Notes

One module = one place. Inside each module keep always the same three drawers: **lectures**, **exercises (TD/TP)**, **documents and reading files**. A single notebook for everything, filled in the order of the timetable, becomes unusable by April.



Paper or digital?

Criterion	Paper	Digital
Speed in the amphitheatre	excellent	average
Diagrams, formulas	immediate	slow and painful
Memorisation	better (the hand helps)	weaker
Searching a word	by hand, slow	instantaneous
Correcting, reorganising	difficult	easy
Main risk	loss, damage	loss of the whole file

Recommended for L1: take notes on **paper** in class, then store the **reworked** version digitally. You keep the speed of the hand and the searchability of the machine.

Naming and backing up digital files

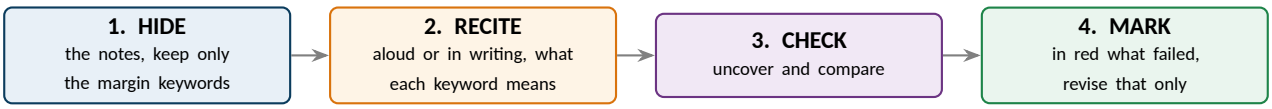
- **A name that works:** `Module_Chapter_Date.pdf`, for example `PHY1_Ch3_FirstPrinciple_2026-10-12.pdf`. Write the date as **YYYY-MM-DD** so that files sort themselves; no spaces and no accents.
- **Names that destroy a semester:** `cours.pdf`, `Nouveau document.docx`, `final_final2.pdf`.
- **The 3-2-1 backup rule:** **3** copies of what matters, on **2** different supports, **1** of them elsewhere (cloud, e-mail to yourself). A memory stick that fails in June is a semester lost.

8 Reusing Your Notes

Notes are not an end in themselves. Taken, reworked and classified, they become the **raw material** of everything you will produce at university: your revision, your reports and presentations, and in three years your dissertation. Reuse has three stages.

Reuse 1: revising actively from your notes

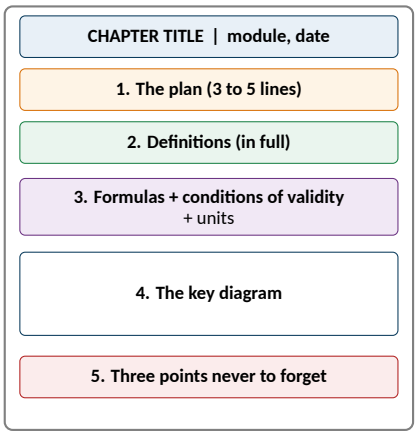
Rereading your notes ten times does not work: your eyes *recognise* the text and your brain believes it knows it. **Recognising is not knowing.** The active method forces you to *retrieve* information from memory.



Example. Your left column says *Conventions*. You hide the right column and say: "$Q > 0$ when heat is received by the system, $Q < 0$ when it is given; W follows the same sign convention." You uncover the page: if one sign was wrong, that entry is marked in red and is the *only* thing you revise again. This is why the two-column method was worth the effort: the left column **is already** the list of questions.

When	What you do	With which notes
Within 24 hours	Rework (15 min)	Raw lecture notes
End of the week	Hide–recite–check–mark	Two-column pages
End of a chapter	Build a mapping page and a summary sheet	All notes of the chapter
Before the exam	Recite from summary sheets; redo only the red marks	Summary sheets and mapping pages

Reuse 2: the summary sheet (*fiche de synthèse*)

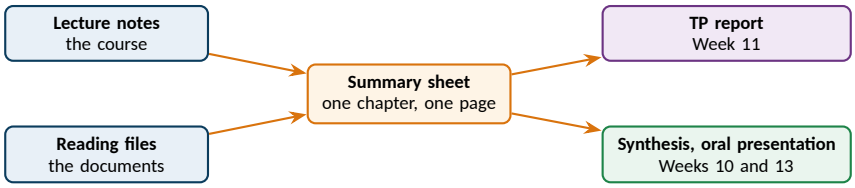


One single page per chapter. It is built from your lecture notes (Method 1 or 2) and your reading files, and it is the page you will recite before an exam.

1. Collect all the notes and reading files of the chapter.
2. Copy the **plan**, then the **definitions** in full.
3. Keep only the **formulas with their conditions and units**.
4. Redraw the **main diagram** from memory, then check it.
5. Finish with the **three points** that must never be forgotten.

Rule: if it does not fit on one page, you have not yet selected.

Reuse 3: from notes to reports and presentations



Each kind of note you learned to take has a precise place in a report:

Your notes	Where they go in a report
Definitions, laws (written in full)	Introduction and theory
Formulas with conditions and units	Theory and calculations
Experiment notes (apparatus, quantity measured, expected result)	Experimental method and results
Reading notes (author, title, page)	Citations and bibliography (Chapter 1: WHO, WHAT, WHERE, WHEN)

This is why you note the **reference** of every reading note and the **date** of every lecture page: without them, the note cannot be reused. In three years, your dissertation will be built the same way:

notes → files → text

9 Chapter at a Glance

To remember

- Note-taking is **selecting**, not transcribing: write the **ideas** in your own words. Listen for the **plan** and write it first.
- Three methods: **linear** (live, recommended), **two columns** (live and revision), **mapping** (summary afterwards).
- In science: **units**, **conditions of validity**, and draw the diagrams immediately.
- A good abbreviation system is **stable, personal, limited, written down**. Never abbreviate a definition, a unit or a condition of validity.
- Rework within **24 hours** (15 min), then classify: one module, one place; paper in class, digital for storage; name files `Module_Chapter_Date`; apply the 3-2-1 backup rule.
- Revise actively (hide, recite, check, mark); build one summary sheet per chapter; reuse notes for reports and presentations.

Test yourself

Q1. What does the teacher's phrase "Consequently…" signal, and what do you do in your notes?

Q2. What do you do during the first minute of a lecture?

Q3. Which two things must always accompany a formula in your notes?

Q4. Rewrite in abbreviations: "When the pressure increases, the volume decreases, provided the temperature is constant."

Q5. Which items must you *never* abbreviate?

Q6. Name the four rules of a good abbreviation system, and the four steps of active revision.