

LESSON SLIDES

How to Study Effectively

Active recall and spaced repetition: what the research says and how to use it

By the end of this session you can

- 🎯 Explain why rereading feels useful but fades
- 🎯 Use active recall in every study session
- 🎯 Space your reviews to match your exam date
- 🎯 Write flashcards and self-tests that work
- 🎯 Choose techniques by the strength of evidence

The illusion of knowing

- Rereading makes text feel familiar
- Familiar is not the same as able to recall
- Restudying raised confidence more than long-term recall
- Exams ask you to produce answers, not recognise them

What a major review found (2013)

High utility

- Practice testing
- Distributed (spaced) practice

Low utility

- Rereading
- Highlighting and underlining
- Summarisation
- Keyword mnemonic

What is active recall?

- Pulling information out of memory without looking
- Also called retrieval practice or practice testing
- Self-quizzes, flashcards, past papers, blank-page recall
- Low stakes: the aim is learning, not a grade
- Always check your answers afterwards

The testing effect in one study

61%

recall after one week for students who tested themselves (40% if they re-read)

- Roediger and Karpicke, Psychological Science, 2006
- Tested after five minutes, re-reading looked better

Forgetting, and why spacing helps

- Memory fades fastest soon after learning
- Each spaced review brings the memory back
- Cramming helps tomorrow's test, not next month's
- Spacing benefits are often larger on delayed tests

The 10–20% spacing rule

- Gap between reviews $\approx$ 10–20% of how long you must remember
- Remember for 1 week: review 12–24 hours apart
- Remember for 5 years: review 6–12 months apart
- Exam in 30 days: review every 3–6 days

A century of research



 Example

Ananya's 30-day plan for one chapter

- 1 Day 1: learn it, then close the book and recall
- 2 Day 4: answer ten questions from memory, then check
- 3 Day 9: redo the missed questions; redraw diagrams
- 4 Days 15, 21 and 27: timed past-paper sections

Passive or active study?

Passive

- Rereading the chapter
- Highlighting key lines
- Watching the lecture again

Active

- Blank-page recall of the chapter
- Answering past-paper questions
- Self-testing with flashcards
- Explaining a step aloud

Flashcards that actually work

- One question per card, with a short answer
- Say or write the answer before flipping
- Keep practising missed cards until you get them right
- Apps such as Anki can schedule spaced reviews
- Paper cards and a calendar work too

Useful extras: explain, ask why, mix it up

- Self-explanation: explain each step in your own words
- Elaborative interrogation: ask why a fact is true
- Interleaving: mix different problem types in one session
- Rated moderate utility: helpful, with less evidence so far

Common obstacles and fixes

- Recall feels hard: that effort is part of learning
- Wrong answers happen: check and correct right away
- Reviews get skipped: put them in a calendar
- Short, regular sessions suit spacing better than marathons

 Quick check

Which study method is an example of active recall?

- A** Highlighting key terms in the chapter
- C** Writing all you remember, book closed

- B** Rereading your notes three times
- D** Listening to a recorded lecture again

Key takeaways

- ✓ Familiar is not the same as remembered
- ✓ Test yourself: practice testing is rated high utility
- ✓ Space reviews at 10–20% of your retention goal
- ✓ Swap rereading and highlighting for retrieval
- ✓ Check answers and revisit what you got wrong