

How to Study Effectively: Spaced Repetition and Active Recall

LESSON SLIDES

How to Study Effectively

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

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1 / 16

How to Study Effectively

SPEAKER NOTES

Ask the room: how many of you reread a chapter and felt sure you knew it, then went blank in the exam? Tell them today's session explains why that happens and what research says works better.

How to Study Effectively: Spaced Repetition and Active Recall

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

By the end of this session you can

SPEAKER NOTES

Read the objectives aloud. Point out that these methods apply to any subject, from Class 7 maths to UPSC polity, because they are about how memory works.

How to Study Effectively: Spaced Repetition and Active Recall

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

The illusion of knowing

SPEAKER NOTES

Ask: can you recognise a friend's phone number when you see it? Can you write it down from memory? That gap is the illusion of knowing. A common misconception is that a lesson that feels easy has been learned well.

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What a major review found (2013)

High utility

- Practice testing
- Distributed (spaced) practice

Low utility

- Rereading
- Highlighting and underlining
- Summarisation
- Keyword mnemonic

What a major review found (2013)

SPEAKER NOTES

This comes from Dunlosky and colleagues' review of ten techniques in Psychological Science in the Public Interest. Elaborative interrogation, self-explanation and interleaving were rated moderate. Ask: which of these do you use most often?

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

What is active recall?

SPEAKER NOTES

Demonstrate blank-page recall: give everyone two minutes to write what they remember from the last slide. Ask: did that feel harder than rereading? That effort is the point.

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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

The testing effect in one study

SPEAKER NOTES

In the experiment, the self-testing group read the passage about 3.4 times and the re-reading group about 14.2 times, yet the testers remembered more a week later. Ask: why might cramming feel effective the night before a test?

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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

Forgetting, and why spacing helps

SPEAKER NOTES

Sketch a forgetting curve that drops steeply and then levels off, the pattern first described by Hermann Ebbinghaus. Ask: when would a review be most useful, just after class or a few days later? A few days later, when recall takes effort.

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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

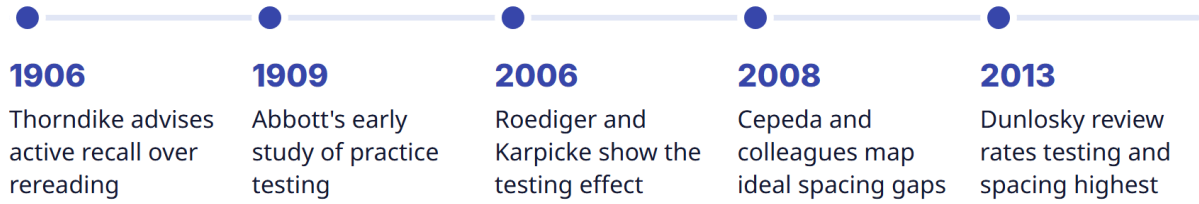
The 10–20% spacing rule

SPEAKER NOTES

The rule comes from a large study by Cepeda and colleagues (2008), summarised in the Dunlosky review. Ask students to work out the gap for an exam 60 days away: 6 to 12 days.

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A century of research



A century of research

SPEAKER NOTES

Stress that these ideas are not a new trend: the Dunlosky review describes more than 100 years of research on practice testing. Ask: why might schools still rely mostly on rereading and notes?

 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

Ananya's 30-day plan for one chapter

SPEAKER NOTES

The gaps of three to six days follow the 10–20% rule for a 30-day exam. Ask students to draft the same plan for one chapter of their own. A common mistake is to reread on review days instead of testing.

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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

Passive or active study?

SPEAKER NOTES

Ask students to convert one passive habit into an active one, for example turning highlights into questions. Passive methods feel smoother, which is why they are so popular.

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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

Flashcards that actually work

SPEAKER NOTES

Show one bad card (a whole paragraph) and one good card (a single question). Ask: why does answering before flipping matter? Flipping first turns recall back into rereading.

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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

Useful extras: explain, ask why, mix it up

SPEAKER NOTES

In maths, interleaving means mixing questions from several chapters instead of doing twenty of one kind. Ask: why might mixed practice feel harder but help in an exam? You must first decide which method a question needs.

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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

Common obstacles and fixes

SPEAKER NOTES

Reassure students that forgetting a card is normal and useful feedback. Ask each student to name one obstacle they expect and one fix they will try this week.

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 Quick check

Which study method is an example of active recall?

- A** Highlighting key terms in the chapter
- B** Rereading your notes three times
- C** Writing all you remember, book closed
- D** Listening to a recorded lecture again

Quick check

SPEAKER NOTES

Answer: C, writing everything you remember with the book closed. The other three are passive review. Take a show of hands before revealing the answer.

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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

Key takeaways

SPEAKER NOTES

Ask every student to write three recall questions on today's session and answer them tomorrow without notes. Then take the five-question quiz on the page.