How to Revise Effectively: A Cognitive Science Guide for Students

Good revision isn't about working harder — it's about working smarter. Scientists who study memory and learning have discovered powerful techniques that can dramatically improve how much you remember and how well you understand what you study. This guide explains how to use those methods — and why they work.

1■■ Retrieval Practice: The Power of Remembering

Retrieval practice means actively trying to remember information rather than just rereading it. Testing yourself strengthens memory far more than re-reading notes.

When you retrieve information, you strengthen the neural pathways that store it. Each time you recall something, your brain learns to find that memory faster and more reliably.

How to do it:
• Cover your notes and write down everything you can remember, then check what you missed.
• Use flashcards or quiz apps (like Anki or Quizlet).
• Try "brain dumps" — write everything you can about a topic on a blank page.
• Explain topics aloud to a friend (or even your wall).

Science check: Karpicke & Roediger (2008) found that students who repeatedly retrieved information remembered 80% more a week later than those who simply re-read notes.

2■■ Spacing: Don't Cram — Spread It Out

Spacing means revisiting material at increasing intervals instead of doing one long revision session. Forgetting between sessions actually helps learning. Each time you struggle slightly to recall information, your brain has to reconstruct the memory — making it stronger and more durable.

How to do it:
• Plan shorter, repeated sessions over several weeks.
• Review topics after 1 day, 3 days, 1 week, and 3 weeks.
• Use a calendar or spaced-repetition app.

Science check: Cepeda et al. (2006) found spaced learning boosts long-term retention by up to 200% compared to cramming.

3■■ Interleaving: Mix Up Your Topics

Interleaving means mixing different topics or types of problems in one session, rather than studying one topic for hours. It helps your brain learn to choose the right strategy and spot links between ideas.

How to do it:
• Mix different problem types or subjects in one study block.

• Switch topics every 30–45 minutes.

Science check: Kornell & Bjork (2008) found interleaving doubled correct answers compared to blocked study.

4■■ Elaboration: Make Meaningful Connections

Elaboration means expanding on what you're learning by linking it to what you already know or by asking why and how questions. Memory stores meaning, not just words — the more connections you make, the easier recall becomes.

How to do it:
• Ask yourself: "Why does this work?" "How does this fit with what I learned before?"
• Use examples from real life.
• Create mind maps showing links between topics.

Science check: Chi et al. (1989) showed that self-explaining ideas doubled learning effectiveness.

5■■ Dual Coding: Combine Words and Visuals

Dual coding means representing information in two ways — for example, using text and diagrams. Visual and verbal memory use separate brain systems; activating both strengthens recall.

How to do it:
• Turn notes into diagrams, concept maps, or timelines.
• Pair key terms with simple visuals.

Science check: Paivio (1991) found combining words and visuals can roughly double recall rates.

■ Sleep, Rest & Phone Use: The Science of Staying Sharp

Sleep: Memory consolidation happens while you sleep — especially during deep and REM sleep. Students who sleep 7–9 hours learn faster and retain more. A 2014 study in *Nature Neuroscience* found that sleep after studying doubles recall the next day.

Rest and Breaks: Your brain follows a rhythm of focus and fatigue (about 45–60 minutes). Short breaks help reset attention and prevent burnout. Try the “Pomodoro” method — 45 minutes of focus, 10 minutes of rest.

Phones and Distraction: Constant phone use fragments attention and memory. Ward et al. (2017) showed that even having your phone visible reduces working memory by about 10%. Keep your phone in another room while studying.

Revision isn’t about how long you study — it’s about how you study. Spacing, testing, mixing, connecting, and resting are scientifically proven strategies to help you remember and understand more effectively.