The Science of Reading (2025) by *Doug Lemov, Colleen Driggs, Erica Woolway*

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Content	Do This/Remember This
Introduction: This is about reading *after* phonics – what the research says translated to the classroom. Book built on 7 core arguments – attention/fluency/background knowledge (BK) /vocab/writing/books/complex text.	• Cognitive processes in reading cannot be inferred from observation • Change is hard
Ch 1: The Science of Reading in 7 Key Arguments. **1.** Building attention: = necessary in effective reading instruction/affects reading speed, prosody, word recognition comprehension (comp)/reading biologically secondary/brains are plastic/cell phones rewire brains. **2.** Fluency: = prerequisite to reading comp at all grade levels/= ability to read at the speed of sight/ = accuracy at speed + automaticity + prosody (appropriate expression + intonation + phrasing)/determines half of comp/issue in older students (Ss) too. **3.** Background knowledge: = most important driver of comp after fluency/ reading comp *not* about skills e.g. making inferences/ability to infer function of prior K/makes for deeper thinking. **4.** Vocabulary: = single most important form of K (not a skill)/ strong correlation: vocab→ comp/causation harder to establish/vocab hard to measure/subset of BK/speech has fewer rare words than books/'language is the mother not the handmaiden of thought'. **5**. Intentional writing development: get better at writing = get better at reading/sentence construction skills needs to be taught not just assigned. **6.** Books = optimal text format for building understanding and comp/ we learn especially well from stories/historically important/Ss find books hard; struggle is beneficial. **7**. Reading complex texts = gatekeeper to long term success/college readiness link to performance on complex texts/'complex' hard to measure. T must know: cognitive load theory, working memory (WM) easily overloaded by complex tasks/learning is a change to your long term memory (LTM) /processing + meaning = stronger assimilation into LTM/generation effect = you remember more if you generate it/transient information effect = explanatory information disappearing before it can be processed = inferior learning/encoding = transferring ideas from WM to LTM / retrieval means getting it back/curse of the expert = easy to forget how you got there/easier to be curious about things you have K about/Nintendo effect = success breeds motivation.	• Effect of achievement on self perception is stronger than the other way round • Using the science can be joyful and need not be formulaic • Reading is effortful if you're not fluent • Fluent readers can't *not* read • Transferable skills are a chimera • Critical thinking processes tied to background knowledge • Writing/ jotting things down offsets cognitive overload by freeing WM • Be unapologetic about the book • Beware of choice and passage-based instruction • Know cognitive load theory • memory is the residue of thought • Be aware of cognitive overload, transient information effect, curse of the expert • The more you know the easier it is to learn What is the best balance between skills and knowledge is the wrong question, like ingredients and cake, ingredients make the cake.
Ch 2: Attending to Attention: Smartphones have implications for reading/Reading has declined significantly – 13yo: 31% hardly read, 14% read every day, linked to smartphone use. Less reading + shallow reading. They may only read books that you assign. Neuroplasticity = brains have been rewired for shorter attention span (neurons that fire together wire together)/TL:DR now common. Rewiring can be reversed by: **1.** Teacher Read Aloud (TRA) = exposed to more /harder (syntactically)/richer text faster) **2.** FluentAccountableSocialExpressive (FASE) = T+S reading together with prosody **3.** AccountableIndependentReading (AIR) = silent reading + annotation/books in hard copy not laptops, research clear on benefits / directed + non-directed annotation helps /skills driven objectives= putting cart before the horse, plan for book driven objectives.	• Brains are plastic – can be rewired so that sustained reading is rewarding • Attention → focus → comp → persistence • Attention is contagious – set it up to be so • Novelty can work with reading as well • Shared reading more meaningful – replace social activity on devices with social reading • Reading aloud can create momentum/flow + provide 'norm signals' • Find money for books they can annotate
Ch 3: Fluency and Ways of Reading: Fluency = accuracy + automaticity + prosody = critical for comp. Fluency: developed via TRA/FASE/AIR, improved when Ss hear/ read/ reread text aloud, expressive oral reading →expressive silent reading → better readers. Repeated reading = 'most evidence-based fluency intervention': T read, Ss follow text, then Ss reread silently/paired/whole class together. Lack of fluency →overloaded WM →weaker comprehension. **1.** Orthographic mapping (OM) = words stored (meaningfully) in LTM essential for fluency, needs practice: rereading/'repeated decoding' improves all 3 parts of fluency. **2.** Strategies: TRA↔FASE↔AIR↔TRA incorporates modelling/ gradual release /practice. a. TRA models prosody/builds their mental models/shows your love of reading. b. FASE ≠ round robin, all should be prepared to read, intentionally assign but don't say how long, reading aloud is driver+ indicator of fluency, strategies: bridge/capture mood/echo/choral response/make mechanics explicit. c. AIR: select text (not complex text, check decoding issues), think about the 'when'.	• Add fluency practice • Model prosodic reading • Build in repeated reading at ALL ages – there ARE dysfluent students age 14 -18 • Orthographic mapping not just important when learning to read, needed later • Reinforce OM of new words with repetition, definitions, question about it • Preview text /prepare foci for TRA • Make active by annotation/questions • Normalise rereading if struggling in FASE • Do AIR at engaging moment • Enlist adult support to scaffold AIR
Ch 4: The Hidden Power of Background Knowledge: Issues: Standardized tests (US) =skills based/ leads to only reading passages/Ts worry background knowledge (BK) boring/Ts don't have BK/Bloom's taxonomy misleading. Useful BK is organized + connected in LTM. Build knowledge by: **1.** Embedding non-fiction (NF): NF text 'in the bull's eye'=directly related to text, 'outside the bull's eye'= unlocks deeper meaning, NF connected to stories easier to remember, timely/topical embedding not all in one go, overlapping questions link fiction/NF. **2.** Embellishments (visual/text-based supports) + knowledge feeding (oral supports during reading): both help to embed BK) needed for deep comprehension. **3**. Use knowledge organisers (KO): = one page document/high-priority K to store in LTM.	• Research says BK in LTM key driver of reading comprehension, not skills • BK can come from other subjects – long term strategy but worth it • Think 'bull's eye'/'outside' for non-fiction • Use questions drawing on fiction/NF • Plan the embellishments + knowledge feeding that will be useful for the text • Use knowledge organizers! They're great!

4. Use retrieval practice (RP): = low stakes quizzing, helps activate what they know + encode knowledge into LTM, can use with KOs, should be easy but not too easy, use elaboration to apply/use not just recall, blocked practice (useful for early encoding), interleaved practice (useful for effective retrieval from LTM)	• Use retrieval practice to interrupt the forgetting curve • Plan retrieval practice • Decide if blocked or interleaved practice
Ch 5: Vocabulary Reconsidered: vocab development 1st on list of factors affecting reading success/ ½ of comp down to vocab (research)/can't rely on 'read a lot'. Teaching vocab: using Context clues inefficient/ineffective/assumes vocab a skill but actually 'micro-K', **better to use** RP, treat as BK when appropriate (reactivate at start of lesson) **1.** Explicit Vocab Instruction (EVI) = plan to introduce a few words* a day, accurate/short definition, give detail of differences, nuances between synonyms, then Active Practice (enables Check for Understanding), but only 360 words a year so… **2.** Implicit Vocab Instruction (IVI) = during reading choose words* that: are a barrier to comp/are easy to define/have multiple meanings/ have familiar synonyms/ are in phrases (idioms) that could trip them up. Method = pause, define then: pronounce or Call & Response or draw picture or brief practice. IVI integral to TRA/FASE, easy to meet a LOT of new words, important for older Ss/technical books, go back to words learned before. *Tier 2 words most useful (Tier 1 = everyday, Tier 3 = technical)	• Instead of Context Clues give accurate student-friendly definition/follow-up question • Shift from 'construct meaning' to 'learn how to use given you know what it means' • Aim for deep knowledge about vocab through practice (start easy, be playful, • Use Explicit AND Implicit vocab instruction • Use 'selective neglect' – ignore some words • Rare words/1000: children's book 31, adult to children speech 9.3, adult book 52, adults to adult speech 17 – books win. • Must PLAN which words, definitions, EVI/IVI, and spiral back
Ch 6: Using Writing to Develop Readers: Writing is slower than speech → more thinking time → more meaning/precision→ they remember more from what they read → better readers. **1**. Formative Writing (FW): Ss 'think in writing' ('Quick Write', 'jot' ideas down/write first then discuss/then revise/model this/keep it brief). **2.** Developmental Writing (DW): Ss write to 'expand syntactic control' a. Art of the Sentence: prompts scaffold/improve syntax/single sentences! b. Sentence Expansion: give short sentence/prompts to expand or embed. **3.** Summative Writing: Ss write to support + explain arguments (break essays into skills and practice/use FW/DW to prep/short summative prompts that actually break down/build up using skills from FW/DW). **4.** Writing Before Discussion: more *value*: enables Ss and T to prepare/Ss more confident/richer discussion, more *transfer*: to LTM from WM. **5.** Stamping: , creates manageable chunks for memory from complex narratives/reworking aids memory/ using stamps frees WM. **6.** Revising: editing =mechanics ≠ revising = meaning making–harder), don't JUST revise essays, more frequent shorter practice (sentences/paras).	• Writing = one of the richest metacognitive tasks we can ask them to do • 'Writing helps you discover what you think' • Model how to review/revise/rewrite • Do writing in class in deliberate short bursts • Choose prompt words carefully: jot vs write • 5 paragraph essays hard to write AND teach • Break down essays into component parts • Then build back up to understand structure • Stamps are brief/own words/reworked • Teach difference editing vs revising • Practice revising smaller chunks to explain how text makes meaning.
Ch 7: The Power of the Book: *[Decline of the book due to: tests content agnostic → use of shorter extracts/ passages/student choice/use of videos/S resistance/belief you can teach transferrable critical thinking/reading skills.]* More books → more knowledge = network effect, accelerates learning. **1.** Stories are Cognitively Privileged: stories a. treated differently in memory/evolution = made groups close knit → increased survival chances/ b. build knowledge + empathy easily as brain treats stories and experiences similarly/easier to remember/ needs to be connected reading/reading together (aloud) enriches connections through shared experience/ **2**. The Medium IS the Message: = the world is complex → needs steady focus to understand it, books → slow, reflective, deep, and thoughtful = the message, and the thinker. **3.** Books are Cultural Capital: knowing useful things gives you cultural capital/ provides opportunities/ opens doors, reverse true→ lack of access is a profound disservice/ excludes people. **4.** All Books Are Equal But… : a. Choose books that: are truly great/model the craft of meaning making at the highest level/will stay with the Ss forever/enable Ss to talk about ideas from a different time and place/will be relevant in 20 years b. Get them to read outside class with frequent, short, specific, factual, straightforward, open Reading Checks.	• Use books that have stood the test of time • Habits e.g. story format hacks WM • Reading about X and 'real life' X very close • Stories easier to remember • Combine power of stories + reading aloud to maximize connection/impact • Demonstrate the deliciousness of the slow, deep reading as antidote to TL:DR • Having lots of linguistic and cultural knowledge increases your chances of success • Choose books carefully • Students may/will struggle; communicate to them that it's worth the effort • Check in often about outside class reading – could be part of Retrieval Practice/Do Now
Ch 8: Close Reading: = focused, detail-oriented rereading of short sections in attentionally-privileged setting + chance to encode (via writing/discussion), short (2-3mins) bursts don't overload WM. **1.** Selecting Texts: text *must* be complex, 5 types of complexity: a. Archaic = older e.g. Austen/pre-complex e.g. C.S. Lewis children's books) b. Nonlinear = arbitrary motion through time e,g, Bigmama c. Complexity of Narrator e.g. The Magician's Nephew d. Complexity of plot e.g. Lord of the Flies e. Intentionally resistant texts combination of a – d e.g. Fahrenheit 451, students will need *cognitive patience* (mindset + self-discipline + self-regulation) for complex text. **2.** Selecting Textual Excerpts: goal holistic understanding of the section, select sections that contribute to the whole, each with clear goal. **3.** Critically Important to Establish Meaning: who did/said what to whom/when, what it/she etc. refers to, intersperse in rereading, more analysis can follow. **4.** Attentionally Privileged Environments: few distractions, WM not overloaded, reduce cognitive load by keeping key sentences visible all the time (helps sustain attention), focus on specific details to build their perception. **5.** Knowledge, Disambiguation, and Close Reading: author assumes BK, need to check. **6.** Questions: intersperse and end with generative activities, types: Key Line (analyze single sentence/ Comparison (two sections in close proximity)/ Pattern (look for recurring idea/phrase with e.g.s)/Sensitivity analysis (see if they can spot subtle changes in a sentence).	• Make rereading key short pieces a habit many times in a lesson • Choose appropriately complex texts, or pre-complex texts that pave the way • Close Reading part of building cognitive patience (with attention, BK, vocab etc.) • Choose sections/sentences because of under-standing they provide • Don't skip Establish (literal) Meaning even if obvious (to you) – still rigorous • Check they have sufficient BK • Orient students to specific, critical details – S/T resources should look the same • Use Embellishment effectively • Select appropriate question/s, during/after • Law of Comparative Judgement- comparing easier than making absolute judgement