

What Are They Thinking? (2026) by David Goodwin



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Content	Do This
Introduction: 3 ways NOT to do it: 'OK?'/ 'Do you understand?'/ 'Does anyone have any questions?'. Learning is <i>invisible/can't</i> be measured → teachers (Ts) generate formative (informing next steps) inferences via checks for understanding (CfUs) that: involve ALL students (Ss)/retrieving helps consolidate = part of learning. Care: not all CfUs are equal.	
Section 1: CfU and Prior Knowledge (PK): 1. PK and Schema Theory: PK key → shapes perception/thinking, = foundation for learning, essential T checks: all have requisite PK, no misconceptions. PK is Velcro: Ausubel quote re. factor →. When PK activated Ss connect new material (NM) to PK (assimilate)/modify existing K (accommodate). PK unevenly distributed → in-school/out-of-school factors. Schema theory: model of how K is organized, generalized & abstract/networked & interconnected/adaptive & predictive, NM more easily integrated into an existing (well-organized) schema = learning.	
2. PK and Meaning-making: Weak/inaccurate connections of NM → schema = fragile learning. Knowing isn't enough → meaning-making: novice (N)/expert (E) schemas differ, progression: N (superficial features) → more structure (via making it visible) → E (deep structure). Using advance organizers (AO): ≠ summary, = scaffold/anchor. Types: expository (short descriptive texts, can CfU for PK), + narrative/skimming/ graphic AOs.	
3. PK and Consolidation: Memory formation: 1. Knowing (no connections) 2. Early consolidation (connect to meaning) 3. Understanding (transferable K) Making Thinking Visible: use elaboration/probe (why? how? etc.)/3Cs (categorise/compare/contrast → reasoning/reflection). PK that backfires: vocab (different meanings)/analogies (over-extended)/cross-curricular links (may not transfer well)/misconceptions (can be VERY resistant to correction, takes time, can even be retained alongside NM).	
Section 2: CfU and the Science of Learning (SoL): 4. The Illusion of Learning: What is taught ≠ what is learned, learning not instantaneous. Poor proxies = Ss busy/engaged/ getting feedback (FB)/calm classroom, curriculum covered, a few correct A. Performance (visible) ≠ learning, need to Cf misU. Curse of expert → without data T fills in gaps for Ss, check/design with contextual variation/take N view/check for misconceptions	
5. Desirable Difficulties: The Paradoxical Nature of Learning: If it hinders performance it can benefit learning. Desirable difficulties → durable + flexible learning, cognitive struggle/making mistakes & correcting/spaced practice → more durable memory traces. Forgetting part of learning via act of retrieving. Spacing: need strong initial encoding/ effortful retrieval/spacing (depends on complexity/changes over time), mapped onto curriculum at macro (over years)/micro (during year) levels. Interleaving + contextual interference: = Ss can contrast (3Cs), need secure K, avoid cognitive overload.	
6. Assessment: The Bridge Between What is Taught and What is Learnt: Many classes CfU too infrequent/superficial. Formative assessment (FA) → data to make better - founded decisions what to do next (probabilistic, can operate on many time-frames, Ss & peers can do FA, FA = both domain-general & domain-specific → think: core principles / adapt to subject matter/collaborate across & within subjects). Summative assessment → current level/predict future, same tool can be both- depends on purpose.	
Section 3 CfU in Action: 7. Ratio: Involving All the Students All the Time: CfU gives T info AND helps Ss → more fluent. Graph: Thinking ratio (TR) ↑ Participation ratio (PR) TR = how hard Ss think (depends on K, varies), PR = how many/for how long (need to build routines/expectations), goal = high TR AND high PR (max. learning), high TR/low PR = few thinking hard, high PR/low TR = 'shallow-land' (can be useful stepping stone).	
8. Cold Calling (CC) : = an invitation to Ss to join conversation. CC is: 1. ...NOT random: clear sequence: Stimulus/T asks to think/T asks Q/T pauses/T asks S/T bounces (better equity, increase PR, increases confidence → no one is bypassed/everyone matters, embeds retrieval throughout lesson (in their heads as well as paper), maintains pace. 2.... NOT a tool for catching Ss out: T explain use of CC/ reasons, T uses supportive tone/ language/body language, models good listening, responds constructively to mistakes, ensure success → helps with motivation. 3. NOT 'No hands up': just means T may call on you, make sure sufficient wait time, scaffold with pair work/mini-whiteboards/warm-	

calling/group calling/sentence-starters/probing for depth. Also avoid: moving too quickly through Qs/asking the same Ss/waiting for 'right' answer.	
9. Mini-whiteboards (MWBs): Benefits: 1. Participation: increases PR to 100%, low stakes, versatile (can do diagrams/text/calculations/drafts/pair work/comparative judgement) 2. Data: vastly increases the number of responses per lesson, instant FB for T, can spot patterns in mistakes/misconceptions, promotes responsive teaching, easy to probe/clarify (after pause). Solutions to issues: 1. Routines: for distributing boards/pens/erasers, getting new pens when needed, when to show answers (3-2-1 go), write big, question mark if they don't know, when to put board down/erase work, routines stifle misuse. 2. Only give Qs they can answer on MWB: not essays/too complex or vague, MCQ/True or False/short answer. 3. Still do work in exercise books (as required)	•
10. Hinge Questions (HQs): = diagnostic question designed to CfU that is required to move on. Can be well-crafted MCQs. HQ design principles: Only one concept (doesn't need essay or extended response)/ unambiguous (both Q & A)/includes plausible distractors (incl. misconceptions)/ can't answer correctly or guess easily with wrong reasoning /quick & easy to do & assess (<1min to answer, <30 sec to interpret). Follow up: most correct = move on, most incorrect = re-teach/address, split = probe further	•
11. Exit Tickets (ETs): Teaching changes Ss. ET & their design: short (MCQ/short answer/T&F/fill in gaps, low-stakes (or none), linked to lesson objectives, not about closure, can be efficiently administered/collected, help to shape what happens next. Issues to fix: must be done independently, not rushed, quick to analyse/analysed before next lesson (either all or sampled). Follow up: see HQs, can plan discussion using some S answers.	•
Section 4 CfU and....: 12. CfU and Special Educational Needs & Disabilities (SEND): FA comes from SEND; what's good for Ss with SEND is good for all. Graduated Approach/cycle = Assess → Plan → Do → Review. CfU = front line, frequent CfU enable effective proactive adaptive teaching earlier than testing (reactive). WM can be bottleneck for Ss with SEND: minimal guidance doesn't work/overloads WM, transient effect bigger issue, smaller chunks needed, effect of extraneous load bigger, more CfU needed. Schema: can be fragmented, scaffold with vocab/visual representations. LTM: retrieval very important → consolidates + gives T FB. CC/MWB need thought – pages 231 – 234.	•
13. CfU and Adaptive Teaching (AT): Used to be 'differentiation': all/most/some LOs, did not work: less motivation/effort. AT same unless: before lesson= proactive AT, plan for all, scaffold, deal with barriers, during = reactive AT, respond to moments of contingency, after = reflection, use data from CfU → short-term/long-term planning. Scaffolding: not designed to be permanent, gradual release of responsibility → independence, too long → expertise reversal effect, too much → shallower learning, Model e.g. I do/we do/you do. Learning isn't linear, meaningful learning takes time, CfU essential for progress.	•
14. CfU and Early Years (age 4-5) by Rachel Ashfield: Same principles/slightly different. First years: rapid brain development/learning/SEL, fragile, needs building, dealing with misunderstanding/gaps. CfU → embedded in everyday practice (not testing). Strategies: 1. Link PK to provision: essential to link NM to PK explicitly & intentionally/analyse gaps. 2. High Quality Interactions: conversations/responsive questioning = CfU → data, can respond in the moment, inclusive, child-centred. 3. Targeted Adult Placement: ensure all children have access to adult, adults can recognize gaps/issues & address/scaffold.	•
15. CfU and Oracy by Nikki Sullivan: Oracy often overlooked. MWBs → each student, doesn't allow for reasoning, may be range of correct responses. Partner Talk: = diagnostic tool, e.g. Turn & Talk/Think-Pair-Share (Lemov), can use MWB to offload WM while talking, T circulates & listens for: errors/misconceptions/partial U/incorrect use of language AND strong explanations T can use to model, follow up: pause class to address misconception/use model answer/collate responses. The Third Turn: as in 'your turn/my turn/third turn', probes encourages deeper thinking , e.g. can you say more about ...? Common Pitfalls: empty talk (talk must be based on PK/K/stimulus, need to establish norms), unchecked misconceptions (S talk must be monitored), transience of talk (talk is transient, decide when it needs to be permanent).	•