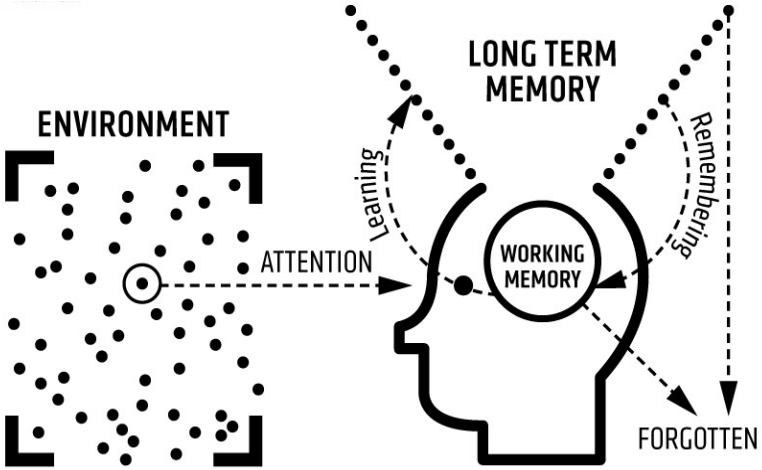
Cognitive Load Theory & Explicit Instruction

Overcoming the bottleneck of memory. We've all heard comments from teachers:
"I taught it, they just didn't learn it" and "Last year's teacher didn't teach it!"
Understanding the Science of Learning – particularly COGNITIVELOAD THEORY, and the practical implications/implementations this has on instruction will ensure *****

Cognitive load relates to the amount of information that working memory can hold at any one time. '*Since working memory has a limited capacity, instructional methods should avoid overloading it with additional activities that don't directly contribute to learning.*' Sweller



Cognitive Load Theory is supported by a robust evidence base that shows students learn best when they are given explicit instruction, accompanied by lots of practice and feedback. Researchers have identified a number of strategies that help teachers to maximise student learning. These strategies work by optimizing the load on students' working memories.

Strategy 1: Tailor lessons according to student's existing knowledge and skill.

Critical to link new to prior knowledge – snowballing & interleaving techniques do this

Strategy 2: Use worked examples to teach students new content or skills.

Worked example/problem/WE/Problem/WE/problem – NOT WE/P/P/P/P

Strategy 3: Gradually increase independent problem-solving as students become more proficient, using a GRR (Gradual Release of Responsibility)

Strategy 4: Cut out inessential information (cut the fluff, do the stuff).

Too many elements adds to extraneous but depends on prior knowledge

When learning to read, adding comprehension can add extraneous load

Strategy 5: Present all essential information together.

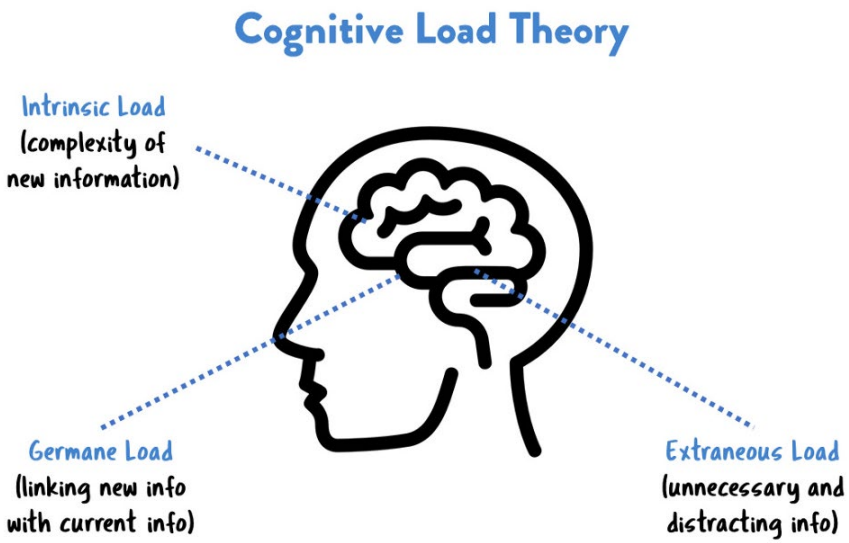
DO NOT have info in 2 spaces – Reduce SPLIT ATTENTION (resist temptation to add/pretty/support)

Don't have necessary info here on one slide and then gone – when students need it for next step

Strategy 6: Simplify complex information by presenting it both orally and visually.

ELIMINATE unnecessary info and DO NOT replicate necessary info – NOT text and images together (one or the other)

This is especially relevant when considering you classroom environment and set up eg: limit visual stimuli on walls



Strategy 7: Encourage students to visualize concepts and procedures that they have learnt.

Kids should get enough practice so knowledge moves into LTM & becomes automated

Reduce extraneous and OPTIMISE intrinsic (pre-teach: vocab, characters, timelines, skills / segment / sequence / manipulate & emphasise / introduce variation)

Extraneous takes focus from learning

Bulletproof / laser-focussed Learning Intentions – what are students going to know at the end of the lesson that they didn't know at the beginning?

Sometimes by chasing completion of the task – we fail to focus on the learning

Recommended reading:

1. Cognitive Load Theory in practice (NSW Department of Education, 2017)
2. Sweller's Cogniitive Load Theory in Action (Oliver Lovell, 2020)

LESSON DESIGN

Components of an Explicit Direct Instruction (EDI) Lesson

Learning Objective — LO
Focused statement describing the skill and concept of the lesson.

Activate Prior Knowledge — APK
Quick review of skill or experience with a statement about how it is relevant to the learning objective.

Concept Development — CD
Concept **definitions** and big ideas supported by **labeled examples**. Precise academic language established. Questions to Check for Understanding.

Skill Development — SD
Modeling ⇄ Guiding
Concept-based steps with precise language. **Matching problems**, one for teachers to **Model** and one for teachers to **Guide** students. Questions to Check for Understanding.

Relevance — REL
Personal, academic, and real-life reasons why the lesson is **important** to learn.

Closure — CL
A skill-based problem, concept-based problem, and writing summary to provide evidence of learning.

TAPP

Creating Academic STUDENT ENGAGEMENT

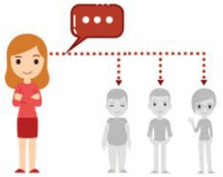
- **Pronounce With Me**
- **Track With Me**
- **Read With Me**
- **Gesture With Me**
- **Pair-Share**
  A→B, B→A
- **Attention Signal**
  Eyes Front, Back Straight
- **Whiteboards**
  Chin-it
- **Complete Sentences**
  Public Voice, Academic Vocabulary

TAPPLE

LESSON DELIVERY

Verify students are learning while you're teaching!

T — Teach First
before you ask the question so students are equipped to respond.



A — Ask a Question
specific to what you just taught.

P — Pair-Share
with a partner so students practice their response to the question.

P — Pick a Non-Volunteer
randomly to verify that everyone is learning.

L — Listen
to student responses so you can make real-time instructional decisions.

E — Effective Feedback
Elaborate, explain or reteach based on student responses.