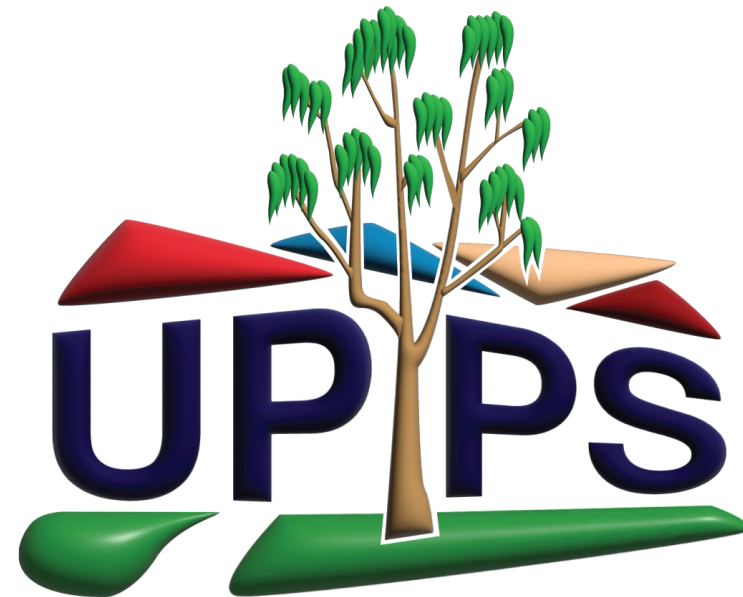


# Upper Plenty Primary School

Leading together to strengthen  
cognitive pathways to support  
successful student learning.



# Learning Intention

To improve our knowledge of our journey to lead, inspire, learn and network to support student learning through strengthening students' cognitive pathways.

# Our School

- Goulburn Area-Mitchell and Murrindindi Network
- 9 composite classes
- 200 students





# Problem of Practice



## PLC Comments

“knew that last term”

“... has been ticked off on this skill”

“knew that last week and now doesn’t”

“... forgot how to...”

Teacher frustration in reteaching of skills and knowledge, as well as the negative influence this had on planning.

# Problem of Practice

## Data was declining

- NAPLAN data
- AToSS data





# Leadership Question

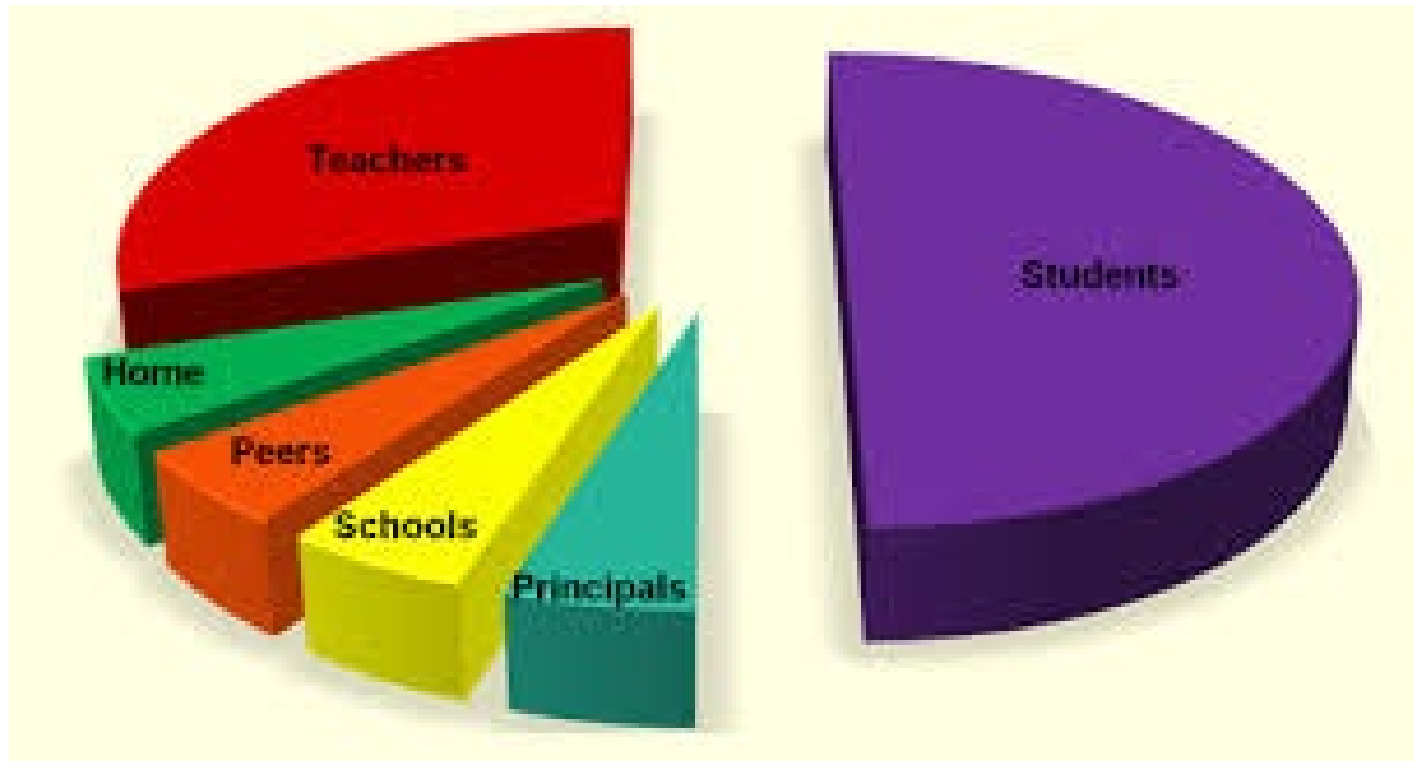
Why don't students know this  
anymore?

Let's do some research!



# Who Impacts Student Learning?

. Teachers make the difference



Hattie, J.A.C. (2003, October). Teachers make a difference: What is the research evidence? Paper presented at the Building Teacher Quality: What does the research tell us ACER Research Conference, Melbourne, Australia.

# Cognitive Pathways



**Dylan Wiliam**  
@dylanwiliam



I've come to the conclusion Sweller's Cognitive Load Theory is the single most important thing for teachers to know [bit.ly/2kouLOq](https://bit.ly/2kouLOq)

5:16 AM · Jan 27, 2017



668



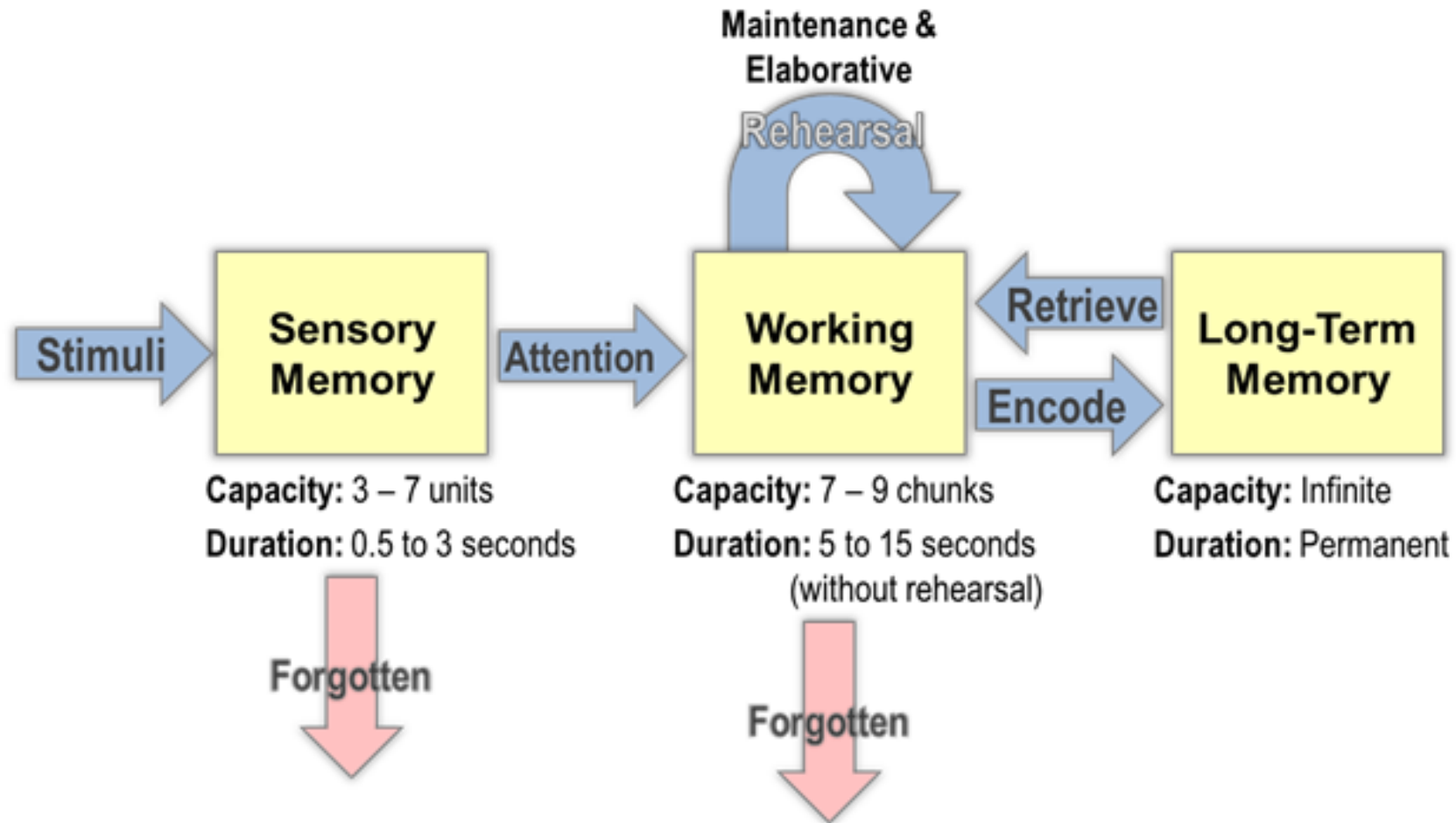
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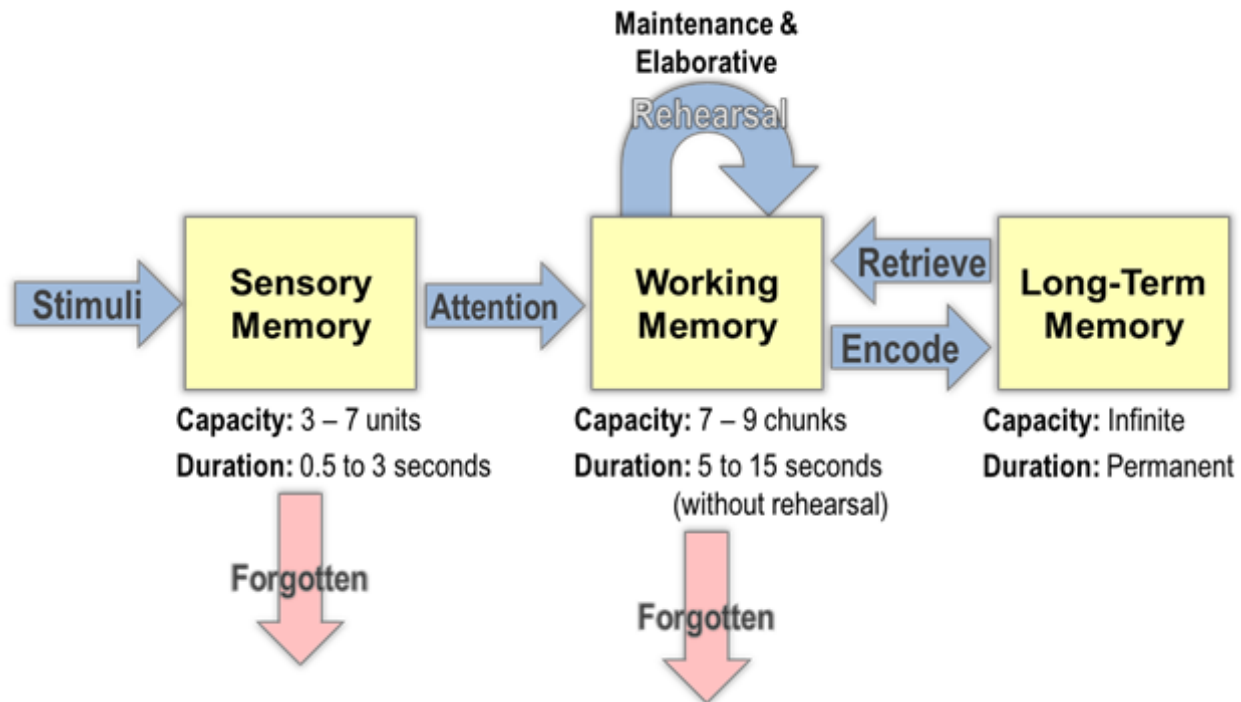
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# Focus on Cognitive Pathways



# Cognitive Pathways



Working memory can become overloaded

but...

memory overload can be prevented.

# Cognitive Pathways



# Cognitive Pathways: CFU



Where does information from our senses initially go?

A. Long-term memory

B. Working memory



# Cognitive Pathways: CFU

What characterises the capacity of our short-term memory?



A. Infinite capacity

B. Limited capacity 

C. Medium capacity

D. Variable capacity

# Cognitive Pathways: CFU

What role does working memory play in the learning process?



A. Storing information indefinitely

B. Organizing and manipulating information



C. Retrieving information from long-term memory

D. Filtering sensory information

# Cognitive Pathways: CFU

On average, how many 'chunks' of information can the average person hold in their working memory at once?

A. 2

B. 4



C. 6


D. 8





# Leadership Challenge

Transferring new knowledge about how students learn  
into our teaching practice.





# Zooming into Cognitive Pathways

## THE PRINCIPLES OF INSTRUCTION

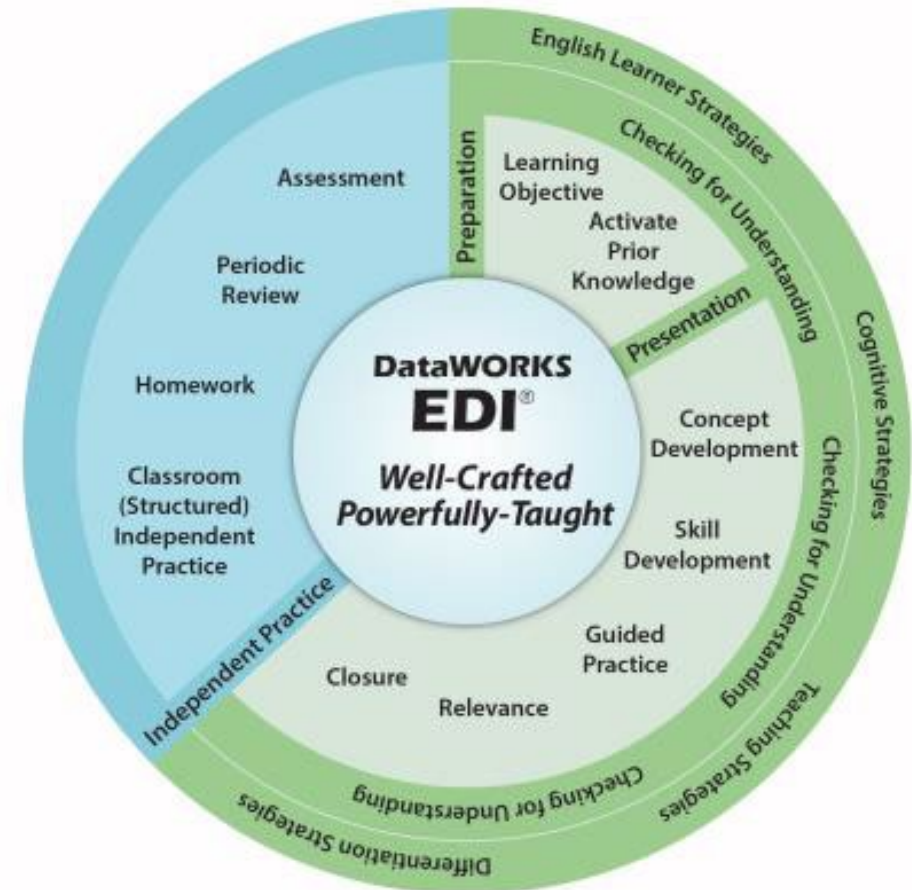
TAKEN FROM THE INTERNATIONAL ACADEMY OF EDUCATION

This poster is from the work of Barak Rosenshine who based these ten principles of instruction and suggested classroom practices on:

- research on how the brain acquires and uses new information
- research on the classroom practices of those teachers whose students show the highest gains
- findings from studies that taught learning strategies to students.



<p><b>01 DAILY REVIEW</b></p> <p>Daily review is an important component of instruction. It helps strengthen the connections of the material learned. Academic recall frees working memory for problem solving and creation.</p>	<p><b>02 NEW MATERIAL IN SMALL STEPS</b></p> <p>Our working memory is small, only handling a few bits of information at once. Avoid its overload — present new material in small steps and process only when four steps are mastered.</p>
<p><b>03 ASK QUESTIONS</b></p> <p>The most successful teachers spend more than half the class time lecturing, demonstrating and asking questions. Questions allow the teacher to determine how well the material is learned.</p>	<p><b>04 PROVIDE MODELS</b></p> <p>Students need cognitive support to help them learn how to solve problems. Modeling, worked examples and teacher thinking set help clarify the specific steps involved.</p>
<p><b>05 GUIDE STUDENT PRACTICE</b></p> <p>Students need additional time to rehearse, elaborate and summarize new material in order to store it in their long-term memory. More successful teachers built in more time for this.</p>	<p><b>06 CHECK STUDENT UNDERSTANDING</b></p> <p>Less successful teachers merely ask "Are there any questions?" No questions are an indication that no problems exist. In contrast, more successful teachers check on all students.</p>
<p><b>07 OBTAIN HIGH SUCCESS RATE</b></p> <p>A success rate of around 80% has been found to be optimal, showing students are learning and also being challenged. Better teachers taught in small steps followed by practice.</p>	<p><b>08 SCAFFOLDS FOR DIFFICULT TASKS</b></p> <p>Scaffolds are temporary supports to assist learning. They can include modeling, teacher thinking aloud, cue cards and checklists. Scaffolds are part of cognitive apprenticeship.</p>
<p><b>09 INDEPENDENT PRACTICE</b></p> <p>Independent practice provides "rehearsal" — a necessary process for new material to be recalled automatically. This reduces the overloading of students' working memory.</p>	<p><b>10 WEEKLY &amp; MONTHLY REVIEW</b></p> <p>The effect involved in recalling recently learned material embeds it in long-term memory. And the more this happens, the easier it is to connect new material to each prior knowledge.</p>

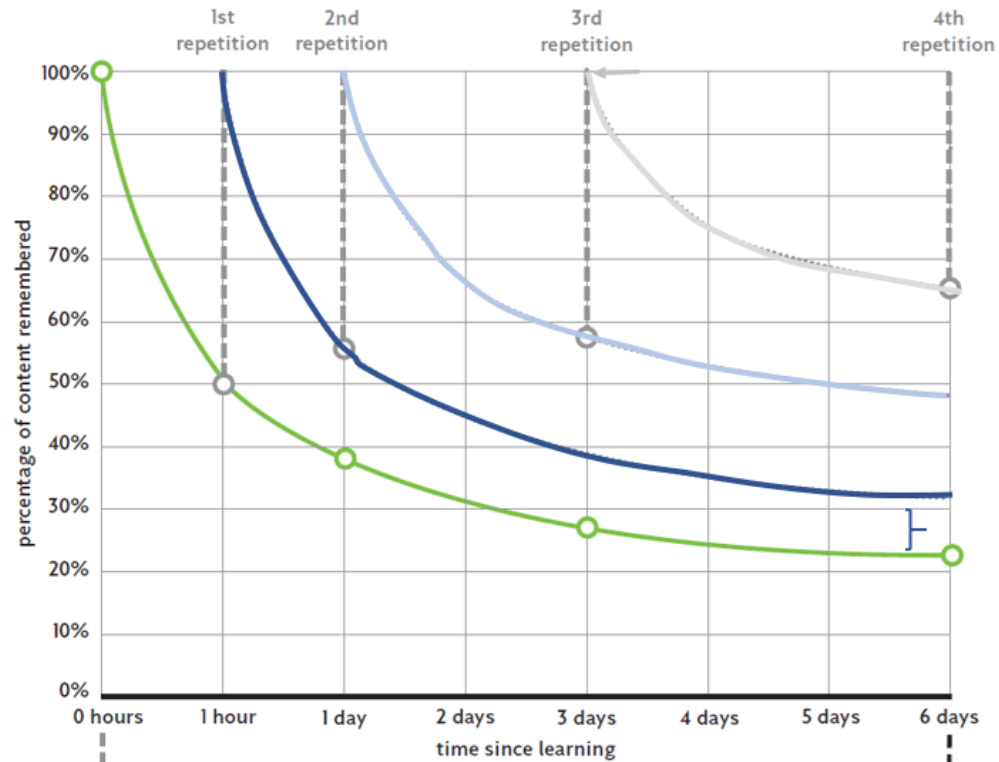


# Key Adaptations to strengthen Cognitive Pathways

- instructional model
- Explicit Direct Instruction
- daily review
- teaching practice
- formative assessment

Practice Principles for Excellence in Teaching and Learning*									
	1. High expectations for every student promote intellectual engagement and self-ownership.	2. A supportive and productive learning environment promotes inclusion and collaboration.	3. Student voice, agency and leadership empower students and build school pride.	4. Curriculum planning and implementation engages and challenges all students.	5. Deep learning challenges students to construct and apply new knowledge.	6. Rigorous assessment practices and feedback inform teaching and learning.	7. Evidence-based strategies drive professional practice improvement.	8. Global citizenship is fostered through real world contexts for learning.	9. Partnerships with parents and carers enhance student learning.
Gradual release of responsibility	15–20 mins	Daily Review	Spaced and Retrieval Practice	Reviewing previously taught concepts and skills using engagement norms. Concepts and skills from previous topics covered and reviewed		continuous checking for understanding and formative assessment that students see in			
	10 mins	Individual Learning Goals	Build fluency	Model the setting of individual goals Provide follow-up support and give specific feedback Help students identify procedures they can use to monitor their own progress					
Build the field	5 mins	Student Preparation	Learning Objectives	Setting the stage for learning by telling the students the purpose and goal of the lesson. Students are engaged through the effective use of strategies such as repeat and read with me					
			Activate Prior Knowledge	Quick review of skill or experience and make connections with previous work to activate prior learning.					
Modelling: I do	15 mins		Concept Development	Show and Tell Teach the concept, rule or content and set expectations of students. Present new materials in small steps. Present the students with examples and non-examples. Precise academic language established.  A hinge-point question can be used to determine whether					

# Cognitive Pathways: Daily Review



The forgetting curve shows...





# Cognitive Pathways: Daily Review



**Spaced practice:** studying a topic in regular intervals provides greater retention than cramming.

**Interleaved practice:** studying many different topics in short bursts is more effective than blocked practice (studying only one topic).

**Retrieval practice:** removing topics and bringing them back after a period of time makes memories more durable and flexible.

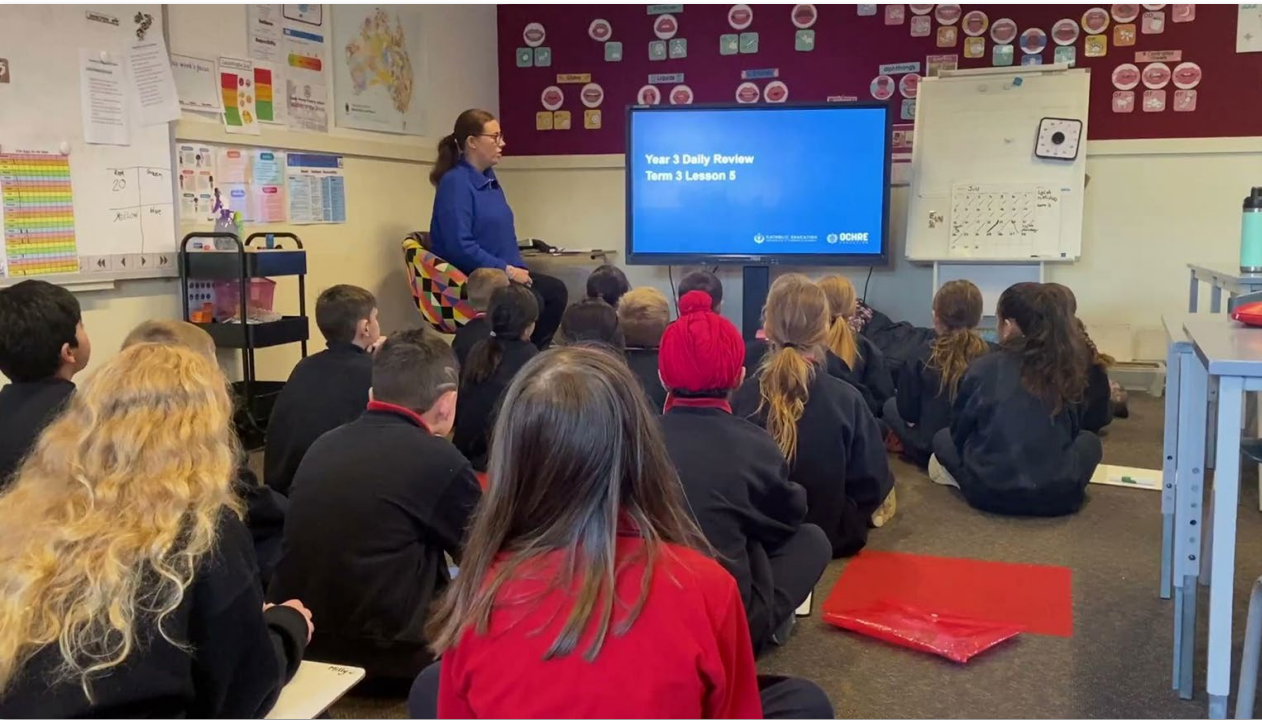
# Cognitive Pathways: Daily Review

Getting the right balance!





# Cognitive Pathways: Daily Review

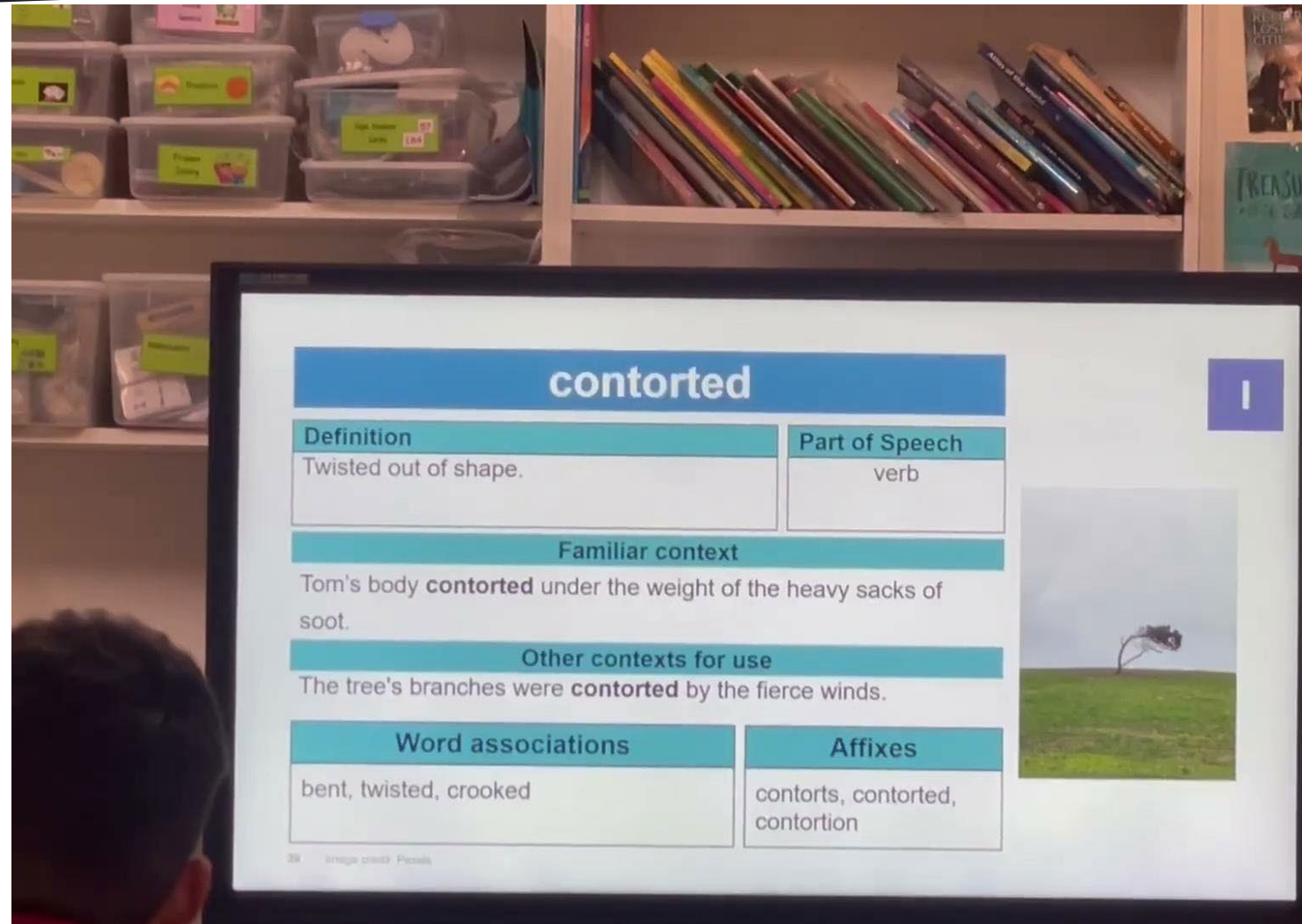


# Cognitive Pathways: Daily Review






# Cognitive Pathways: Daily Review



The image shows a classroom setting with a shelf of storage bins and books. In the foreground, a tablet displays a word card for the word "contorted". The card includes a definition, part of speech, familiar context, other contexts for use, word associations, and affixes. A small image of a tree with a bent branch is also visible on the right side of the card.

contorted	
<b>Definition</b> Twisted out of shape.	<b>Part of Speech</b> verb
<b>Familiar context</b> Tom's body <b>contorted</b> under the weight of the heavy sacks of soot.	
<b>Other contexts for use</b> The tree's branches were <b>contorted</b> by the fierce winds.	
<b>Word associations</b> bent, twisted, crooked	<b>Affixes</b> contorts, contorted, contortion





# Cognitive Pathways: Daily Review

From watching the daily review, I noticed....

From watching the daily review, I am wondering...





# Leadership- Getting Started



## School Improvement Team

- listened to and acknowledged the frustration of staff
- linked into current research we had become aware of
- commitment to learning together as a leadership team
- developed a clear focus of where we wanted to go
- started small, trialed with Kylie, our Learning Specialist, (2021) before introducing to whole staff
- unpacked and reflected on feedback to SIT provided by Kylie
- through consultation decision to implement in one area across the school

# Leadership- Leading Others

- presented staff with the why
- targeted professional learning
- knowledge sharing to improve their confidence
- peer observation of daily review
- provision of slides with worked examples
- focused on one curriculum area
- dedicated collaborative planning time
- strategic staffing
- formative assessment
- slow and steady





# Leadership- Leading Others



## Learning how to learn and agreed engagement norms

- icons and symbols
- call to attention and cueing
- pair-share
- sentence stems and response structures
- mini whiteboards
- cold calling
- checking for understanding
- questioning: process and probing

# Adjusting the Delivery

Solve the following problems:

	H	T	O		H	T	O
	3	6	4		8	4	5
-	2	8	2	-	2	3	9



Multiplication facts – x9

$$8 \times 9 = 72$$

$$6 \times 9 =$$

$$2 \times 9 =$$

$$5 \times 9 =$$

$$3 \times 9 =$$

$$10 \times 9 =$$

$$1 \times 9 =$$

Challenge

$$256894 \times 9 =$$

# Adjusting the Delivery

## You Do

- Edit the sentence to make it correct.
- Revise the sentence to make it more interesting.

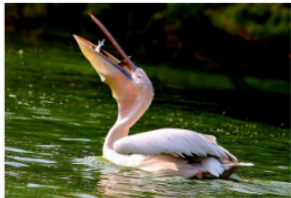


1. Make sure full stops and capital letters are in the correct places.
2. Add in extras such as similes, adverbs, adjectives, sensory details.

### CFU:

- How did you know where the first sentence ended?
- What interesting things did you add in?

the pelican dove down into the water, and came back to the surface with a fish in his mouth he gulped it down in one bite



Example:

**A**t a quiet beach, the **hungry, skillful** pelican dove **gracefully** down into the water, and came back to the surface with a fish in his mouth. **H**e gulped it down **greedily** in one bite. **A**t last, his stomach no longer **felt like a hollowed out log**.

**Write a sentence describing something you have *endured***



# Adjusting the Delivery

Use the number track to count the difference



9 takeaway 6 is

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Count backwards from 36 to 7

							7	8	9	10
	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30
	31	32	33	34	35	36				



# Leadership- Monitoring Progress



- eyes and ears opened, mouths closed
- Kylie's coaching and mentoring
- acknowledged the hard work
- celebrated the positive rewards and impact on student learners
- gathered data through learning walks
- provided regular feedback opportunities



# Gathering Feedback along the way

What do you still not understand or qu's about: cognitive load: spaced/interleaved / & retrieval practice?

What ways can we make sure we plan for this?

What can we do if we practice what is recommended but ~~st~~ student still struggle?

How can we implement this knowledge + understanding into ~~our~~ our practice?

How will this change our instructional model?

How does the Daily review change the structure of time spent on each subject/learning area for planning weekly?

Fit in daily review with the teaching of new information. **Agreed!** How does this change the timing of each part of the lesson?

- Where do you start with notes?

How do I start daily review in literacy? - concepts are broader

What was the main idea / take away from the PL for you?

importance of this!

importance of revision and daily review

being aware of cognitive load

performance vs learning

environmental stimuli on cognitive load

Quick reviews on a range of topics; than sticking to one topic.

You can differentiate your review to reach all students.

**Regular reviews in each subject area is critical.**

**Review! Review! Review!**

We see all the time how students forget things they used to know → this explains why!

How can we act on this?

Experiment with creating Daily Reviews.

Use **recite, recall, apply** model.

worked examples

share PP's with staff <sup>examples</sup>

**Powerpoint reviews**

Identify students point of need for daily review

plan for what topics you review when/after teaching

Identify the main skills to be taught

Discuss/plan how we can introduce this into our weekly/term planning?

See how others have done this

Trial in one area eg Maths

Do you agree or disagree with this statement? Why?

**Agree**

From my experience - this is a huge factor for student with learning difficulties. How can we use this knowledge to improve our teaching practice to make it more effective?

**Agreed!**

Agree - Latte rather than overfl milkshake

Disagree - building relationships is more important! (Beth)

**Agreed.**

If there is too information students may only retain or possibly not all.

definitely noticed when teaching prep that students did well when the task was the same and only the content had changed → cognitive load was reduced.




# Barriers to Overcome




## **Changing the mindset of teachers**

- too much content
- too much time (teaching impact)
- valuing the whiteboard as formative assessment
- time on floor (students)
- staying on track
- focus on retrieval not teaching



# Impact of Leading, Inspiring and Learning



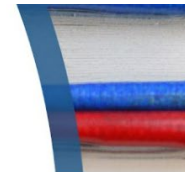
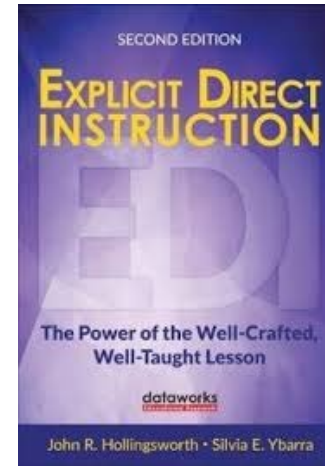
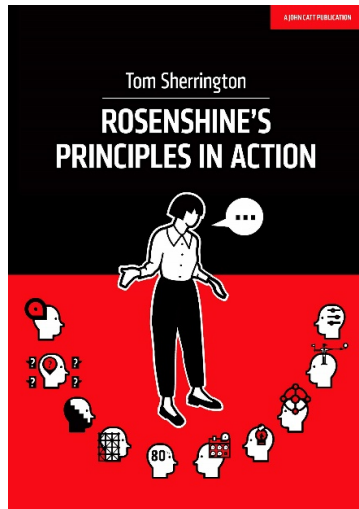
## Outcomes of our work

- whole school approach to strengthening pathways
- embedded in math's and literacy
- bank of slides
- linking to other available high quality resources
- transparency shared drives
- students engaged, routines known
- results and data improved- NAPLAN, DIBELS, etc.
- formative assessment improved
- student voice/ survey feedback examples



# Strategies for Leading Together

## Resources we used along the way



### Learning Difficulties Australia

@LearningDifficultiesAustralia · 2.29K subscribers · 28 videos

Learning Difficulties Australia is an association of teachers and other professionals dedic...more

[youtube.com/watch?v=6UVa99LVrE&feature=youtu.be](https://youtube.com/watch?v=6UVa99LVrE&feature=youtu.be) and 1 more link

Subscribe

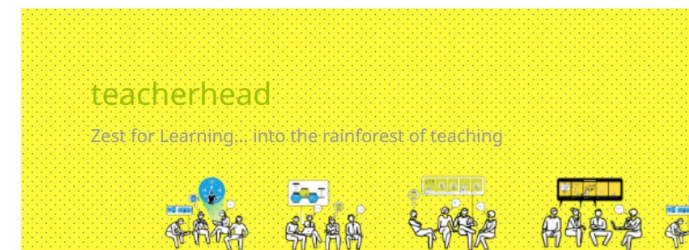
Home Videos Playlists

Teach Like a **CHAMPION**®

LEARN

### DOUG LEMOV'S

Reflections on teaching, literac



Home About Training and Consultancy YouTube

Q&F | 92

THINK PAIR

Q&F | 90

Q&F | 96

CHECK FOR UNDERSTANDING

# Impact of Leading, Inspiring and Learning



# Leading, Inspiring, Learning and Networking

Two key takeaways from today in leading together





# Learning Intention



To improve our knowledge of our journey to lead, inspire, learn and network to support student learning through strengthening students' cognitive pathways.

Questions

# Thank you