

# WELCOME WORK

What techniques do you use to get students to remember key knowledge?

What is the difference between rehearsal and retrieval practice?

What does encoding mean in terms of memory?



# WHO AM I?

Matthew Hirst –

- Former Sport Coach
- Ex-Assistant Curriculum Lead of Science (Teaching and Learning) and Head of Chemistry, George Stephenson High School
- Ex-Head of Chemistry and Teaching and Learning Lead at Emmanuel College and now Lead Practitioner
- Rugby enthusiast
- Sweet Connoisseur



# SESSION OUTCOMES

- To go away with **at least one idea** that can be used in your classroom tomorrow to help support students long-term retention of key knowledge.

Three strands

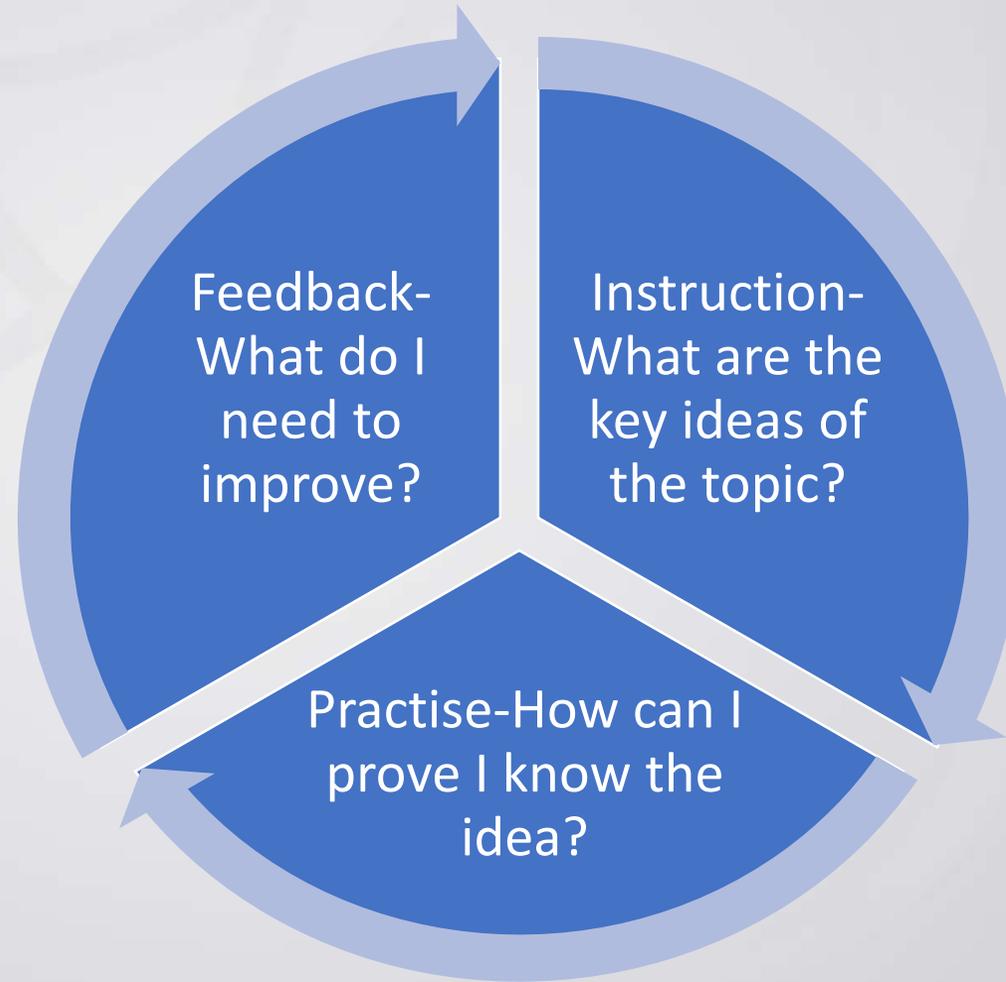
Teaching- What can we do as teachers?

Learning- What can students do?

Curriculum- What order should we teach?



# EMMANUEL TEACHING CYCLE



# KEY VOCABULARY

Knowledge- Anything we believe to be true. Covers all aspects of blooms taxonomy

Skill- the right application of knowledge

Practice- Any time a student is using a knowledge or a skill

Retrieval practice- any time a student uses a skill or knowledge from their long term memory



# EXPERT TEACHING- PRACTICE

We do not learn from  
experience... we learn  
from reflecting on  
experience.

- John Dewey



- Poor practice leads to poor performance- Jim Pollock former Scotland international, Director of Rugby at RGS and my coach



# JONNY WILKINSON- KICKING ROUTINE



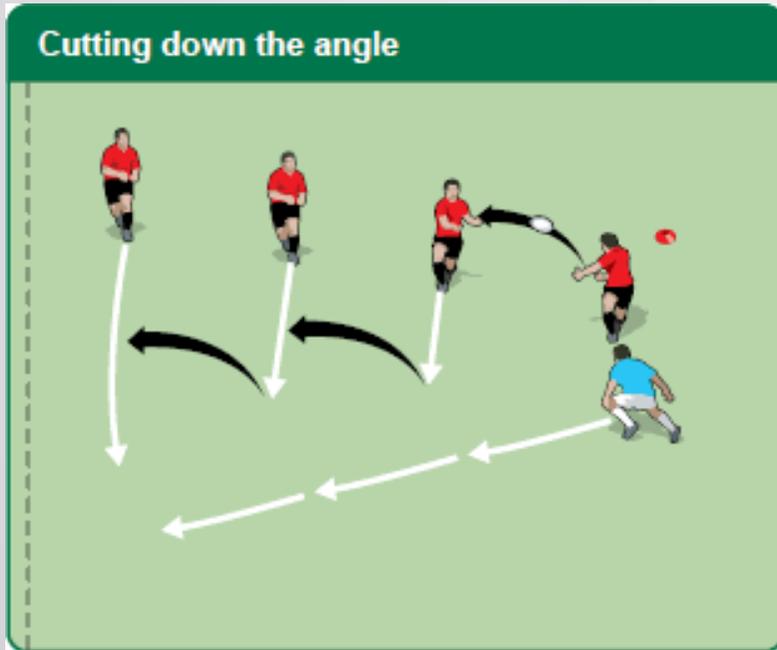
"Great players and kickers are great because they've done fantastic amounts of great practise. Everything you've done since you started is there in the bank to be drawn upon."



# EXPERT TEACHING- PRACTICE

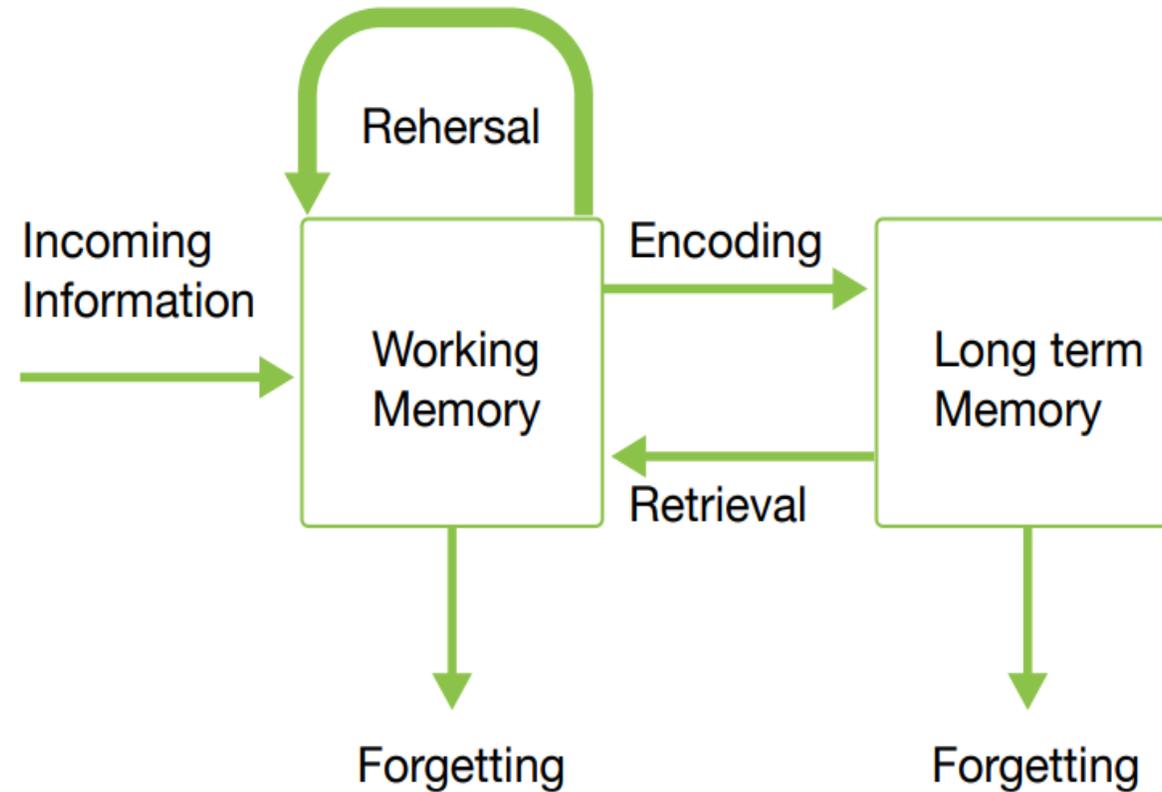
Drills- Repeating a skill over and over again till it is over learnt

Rehearsal- small game scenarios that allows for which allow us to use our skills



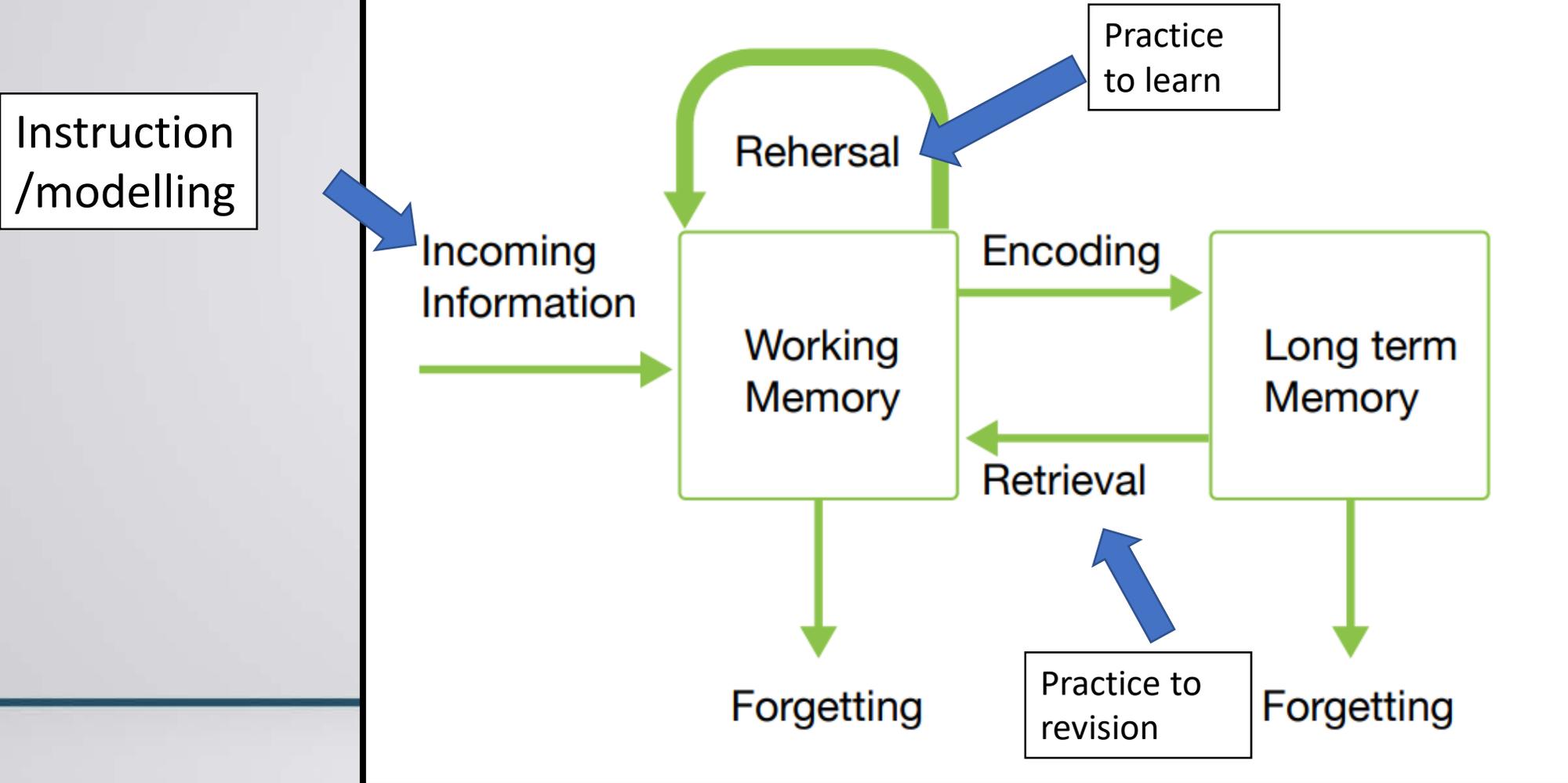
# EDUCATION ENDOWMENT FOUNDATION (2019)

**Figure 6: Working memory and long term memory**

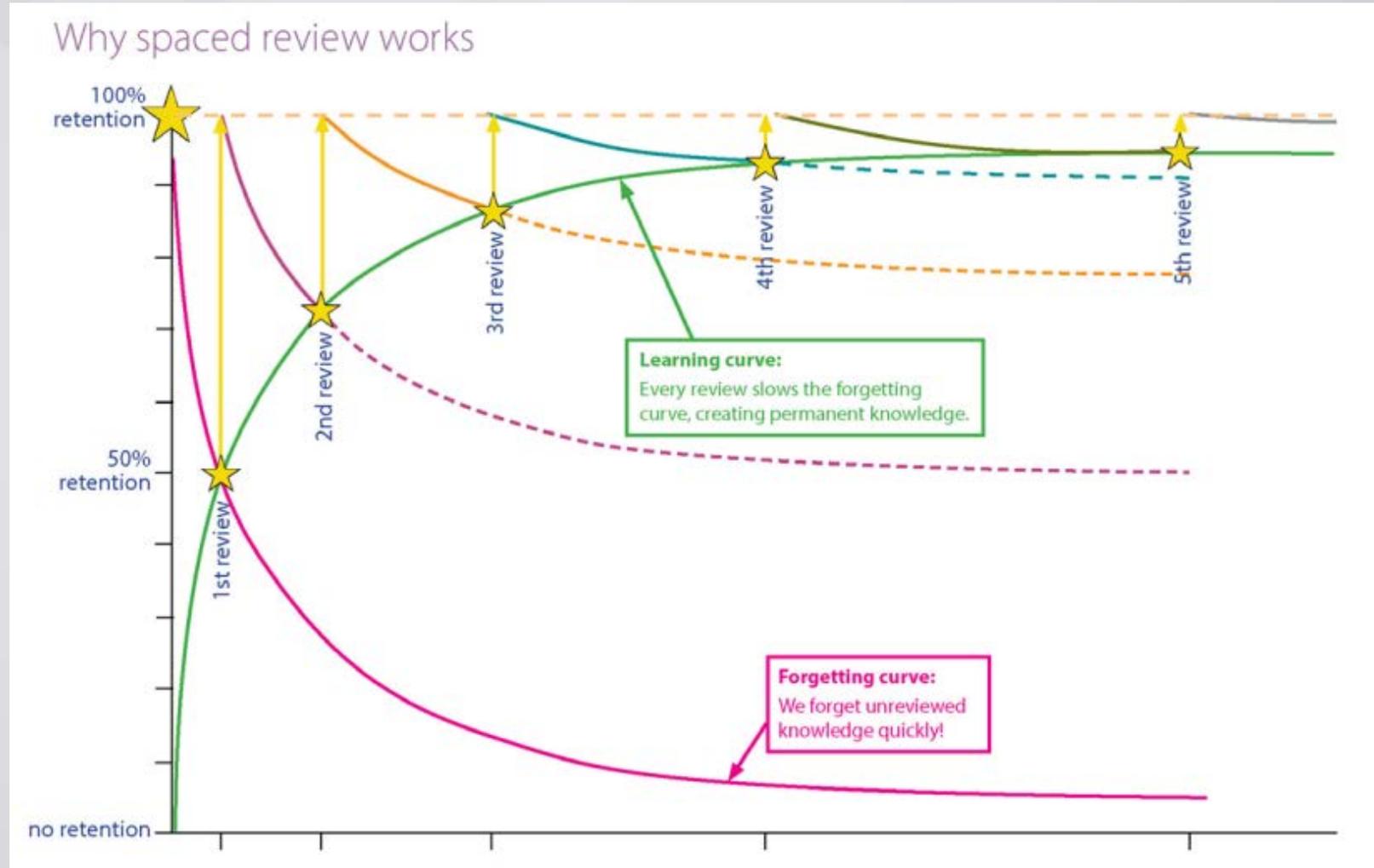


# PRACTICE IS THE KEY TO REMEMBERING

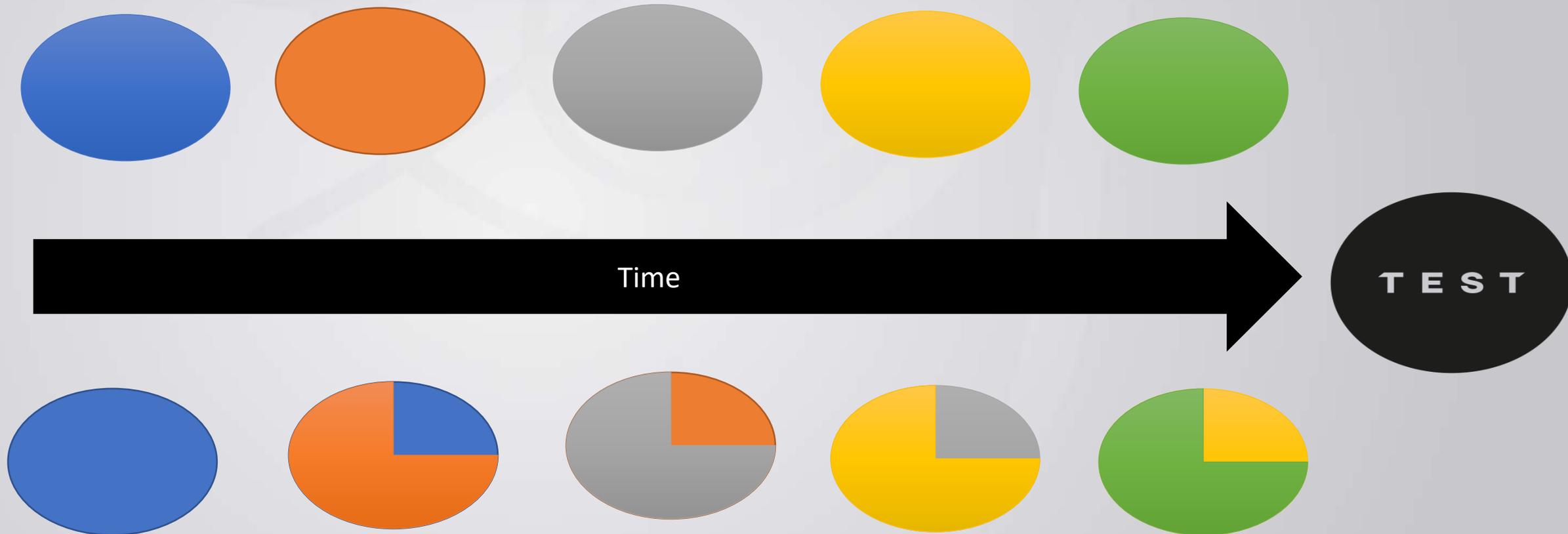
**Figure 6: Working memory and long term memory**



# OCR PSYCHOLOGY A LEVEL

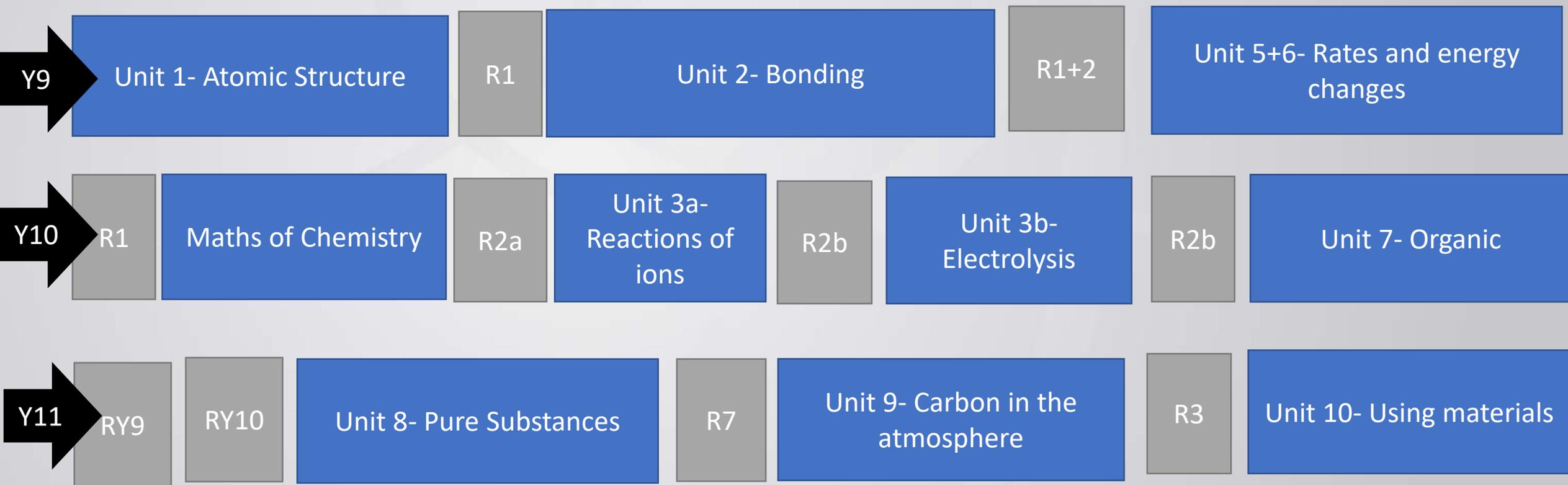


# Long term retention and cognitive load



# LONG TERM CURRICULUM STRUCTURE

- Include planned review lessons within units and throughout a year



# 1. WHAT IS THE PROCESS OF MEMORIES MOVING FROM THE WORKING MEMORY TO THE LONG TERM MEMORY?

A. Rehearsal

B. Retrieval

C. Encoding



## 2. WHAT WAS THE NAME OF MY FIRST SCHOOL?

- A. George Stephenson Middle School
- B. George Stephenson High School
- C. George Stephenson Academy



### 3. WHAT WAS THE DIFFERENCE BETWEEN REHEARSAL AND DRILLS?

- A. Drills can only be used to learn skills but rehearsal can't
- B. The rehearsal comes at the end of the practice phase and drills come at the start
- C. The rehearsal is used to apply what have been taught



# 4. WHAT DID THE OCR DOCUMENT CALL RETRIEVAL PRACTICE OVER TIME?

A. Spaced review

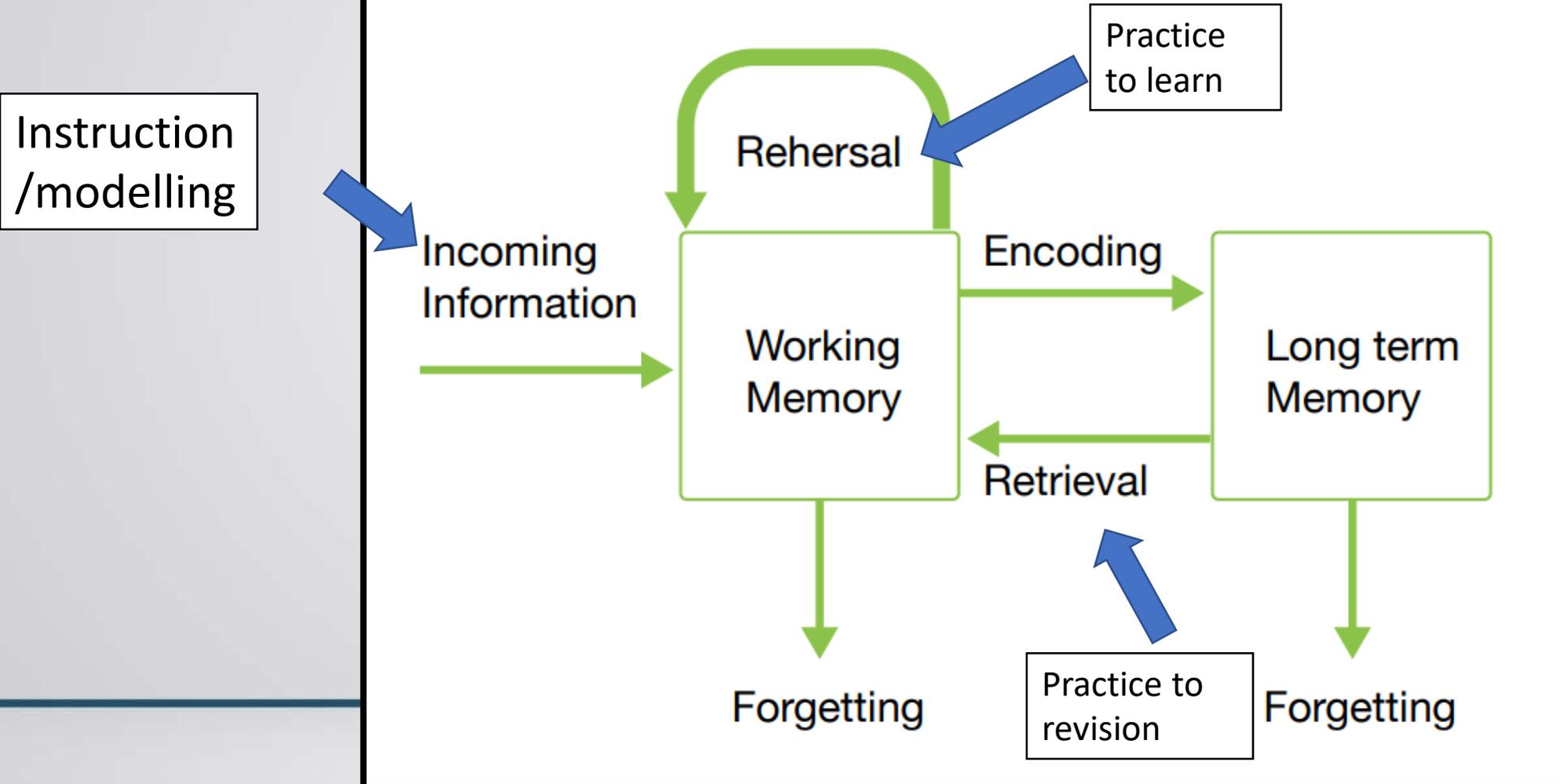
B. Distributed practice

C. Interleaved practice



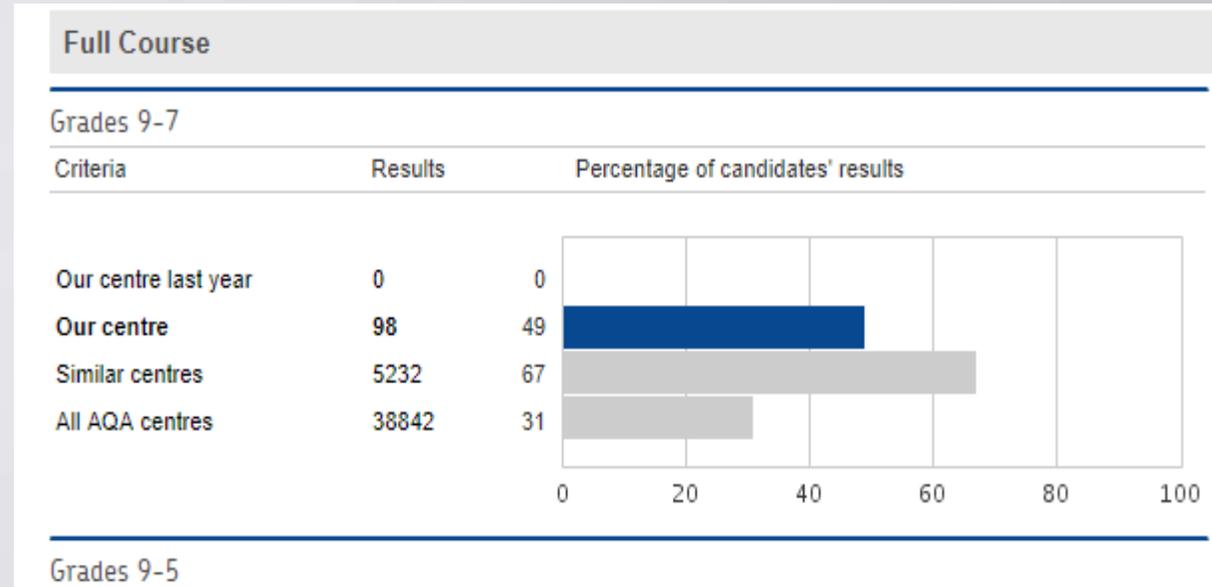
# PRACTICE IS THE KEY TO REMEMBERING

**Figure 6: Working memory and long term memory**



# RE- USE OF MULTIPLE CHOICE QUESTIONS FOR ASSESSMENT

- At key stage 4 students complete a 45 mark half term multiple choice assessment each half term
- Grades are not given but scores are ranked
- Quick and easy to apply, mark and allow for a broad range of retrieval practice



QUESTION - Find somebody who:	Answer:	Signed:
1. Define the terms exothermic and endothermic		
2. Name the salts made by nitric, sulphuric and hydrochloric acid		
3. State the definition of the term electrolysis		
4. State the ions released by an acid then what is released by a alkali		
5. Write the mole equation		
6. Describe the test for water		
7. Write the word equation for the reaction of lithium and hydrochloric acid		
8. Explain why $\text{Ca}^{2+}$ ion is attracted to the negative electrode in electrolysis		
9. Explain why a solution of copper chloride needs to be left in a basin to form crystals		
10. Explain why a lid is used when measuring a temperature change		



# STEM CLUSTER

**Welcome work-** At the start of lessons reviewing work that is being complete during that unit or year

**Consolidation homework's at KS5-**  
Routine revision homework that reviews pervious learning

	Cons number	Year 12 Teacher	Year 13 Teacher
<b>25 February 2019</b>		<b>Half term</b>	
<b>04 March 2019</b>	1	<b>MHI/RSt</b>	<b>DOs</b>
<b>11 March 2019</b>	2	<b>DOs/LNi</b>	<b>MHI/RST</b>
<b>18 March 2019</b>	3	<b>MHI/RSt</b>	<b>DOs</b>
<b>25 March 2019</b>	4	<b>DOs/LNi</b>	<b>MHI/RST</b>
<b>01 April 2019</b>	5	<b>MHI/RSt</b>	<b>DOs</b>
<b>08 April 2019</b>	6	<b>DOs/LNi</b>	<b>MHI/RST</b>
<b>15 April 2019</b>	Yr 13- Organic	<b>Easter</b>	
<b>22 April 2019</b>			



# FIND THE 3 PROBLEMS IN THE FOLLOWING STATEMENTS

- The 3 parts of the Emmanuel Teaching cycle are instruction, practice, assessment
- Welcome work is used in STEM to review work that was completed by students from the previous lesson
- You only forget information from your working memory



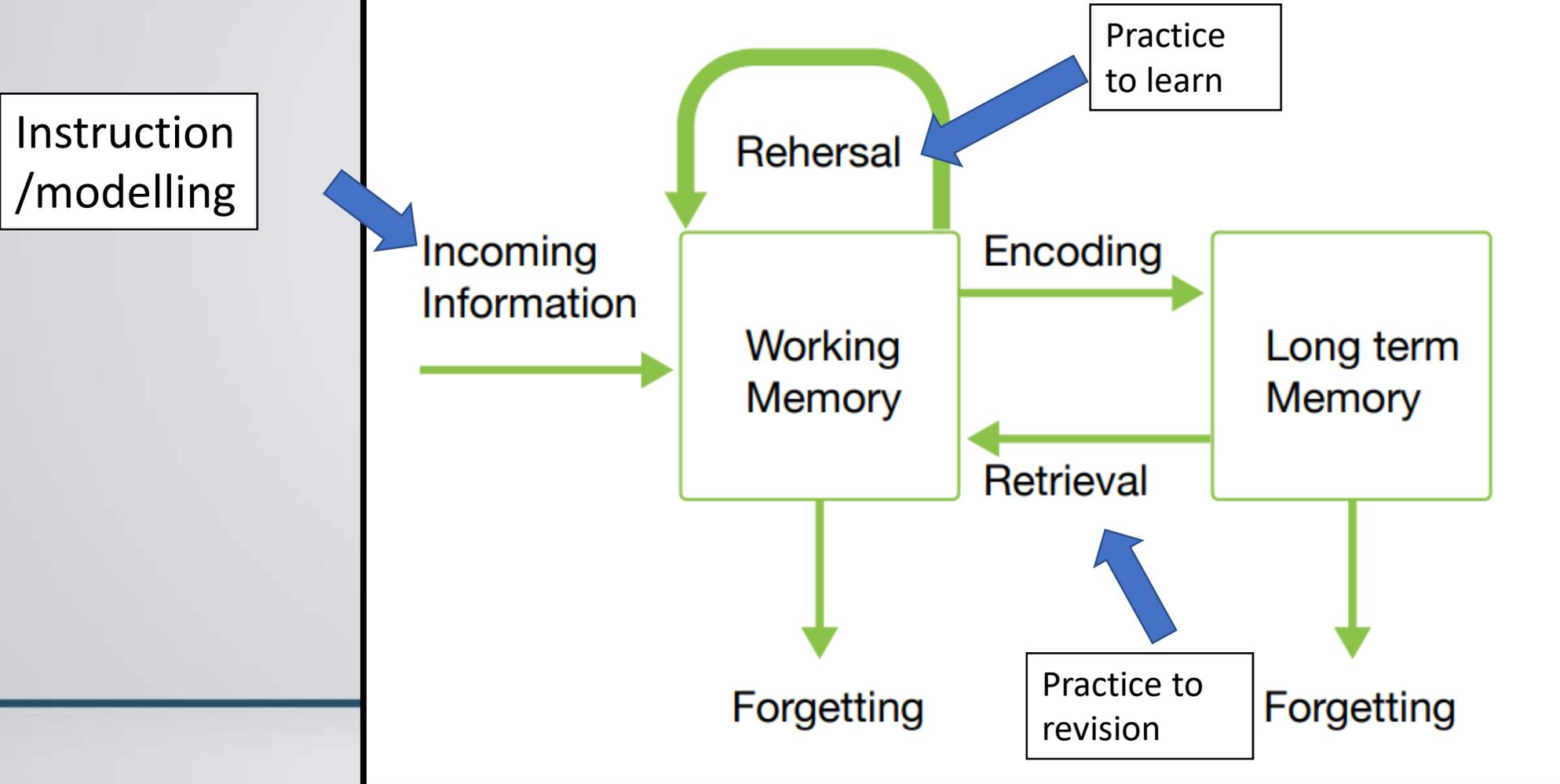
# HISTORY- FINDING THE COMMON MISCONCEPTIONS

<p><b>Dunkirk Battle of Britain</b> was also known as Operation Sea Lion.</p>	<p>It was decided that Berlin would be divided into 2 sections at the Yalta Conference.</p>	<p>The Treaty of Versailles was signed in 1920.</p>	<p>In a communist society there is great differences in wealth between the rich and the poor.</p>
<p>Kristallnacht happened as the Nazis intended.</p>	<p>Japan and France emerged as superpowers after the Second World War.</p>	<p>The Nazis were not very popular amongst farmers in the countryside.</p>	<p>In attempt to control inflation, Stresemann borrowed money from China.</p>
<p>The first atomic bomb was dropped on Nagasaki in 1942.</p>	<p>David Lloyd pursued a policy of appeasement with Hitler.</p>	<p>Archduke Franz Ferdinand was shot in the stomach during the assassination.</p>	<p>Truman replaced Churchill as the British Prime minister after the Yalata conference.</p>
<p>The Treaty of Versailles stated Germany was only allowed 30 submarines.</p>	<p>Trench foot was caused by dead rodents.</p>	<p>Militarism is the belief that one's country is superior.</p>	<p>George Clemenceau wanted Germany to be treated very generously after the war.</p>



# PRACTICE IS THE KEY TO REMEMBERING

**Figure 6: Working memory and long term memory**



- 1. Distributed practice** - spreading out study over time
- 2. Highlighting/underlining** – including pretty writing
- 3. Elaborative interrogation** - being able to explain a point or fact
- 4. Practice testing** - Self-testing to check knowledge - especially using flash cards
- 5. Re-reading**
- 6. Self-explanation** - how a problem was solved
- 7. Imagery** - forming mental pictures while reading or listening
- 8. Summarising** - writing summaries of texts
- 9. Interleaved practice** - switching between different kinds of problems
- 10. Keyword mnemonics** - choosing a word to associate with information



## Answers- In order

**Practice testing** - Self-testing to check knowledge - especially using flash cards - **HIGH**

**Distributed practice** - spreading out study over time - **HIGH**

**Interleaved practice** - switching between different kinds of problems - **MODERATE**

**Elaborative interrogation** - being able to explain a point or fact - **MODERATE**

**Self-explanation** - how a problem was solved - **MODERATE**

**Summarising** - writing summaries of texts - **LOW**

**Highlighting/underlining** - **LOW**

**Keyword mnemonics** - choosing a word to associate with information - **LOW**

**Imagery** - forming mental pictures while reading or listening - **LOW**

**Re-reading** - **LOW**



# REFLECTION IS RETRIEVAL- EVALUATE THE SESSION

1. What was your highlight of the session?
2. How could it be improved?
3. What are you going to take away?

Resources can be found:

- 1) Via the twitter account @MatthewJamesHi2
- 2) [hirstm@emmanuelctc.org.uk](mailto:hirstm@emmanuelctc.org.uk)



# KEY LITERATURE

Revision Techniques- <https://www.aft.org/sites/default/files/periodicals/dunlosky.pdf>

Using retrieval practice-

<http://pdf.retrievalpractice.org/RetrievalPracticeGuide.pdf>

Space retrieval practice-

<http://pdf.retrievalpractice.org/SpacingGuide.pdf>

Retrieval and transfer of knowledge-

<http://pdf.retrievalpractice.org/TransferGuide.pdf>

Effect of quizzing-

<https://pdfs.semanticscholar.org/5890/758fdccf8e4ea75571f7d8741940660ba38f.pdf>

Effect of multiple choice quizzing-

[https://bjorklab.psych.ucla.edu/wp-content/uploads/sites/13/2016/07/Little\\_EBjork\\_RBjork\\_Angello\\_2012.pdf](https://bjorklab.psych.ucla.edu/wp-content/uploads/sites/13/2016/07/Little_EBjork_RBjork_Angello_2012.pdf)

