

## A Two-Day Lesson Plan

The two-day lesson plan addresses the following aspects of the National Standards for High School Psychology Curricula:

- **Standard Area:** Memory
- **Content Standard 1:** Processes of memory
- **Learning Standards:**
  - Explain the processes of encoding, storage, and retrieval
  - Describe systems of memory (i.e., sensory, working, and long-term memory)
  - Differentiate types of memory (i.e., implicit and explicit)

The structure of the lesson plan (C.H.A.C.E.R.) and some activities are adapted from Dixon (2019).

<b>Lesson Plan – Day 1</b>	
<b>C</b> Consolidate	<p><b>Key Terms Traffic Lights</b> (see page 7)            Students assess their understanding of the key concepts covered in the unit.</p>
<b>H</b> Hook	<p><b>Memory Test</b>            Students take <a href="#">this memory test</a>.</p> <p><b>Think-Pair-Share</b>            Students answer this question: <i>What were they doing cognitively in order to try to remember the information?</i></p>
<b>A</b> Activity	<p><b>Back-to-Back Activity</b> (see page 8-9)            Students work in pairs and they sit back-to-back on two chairs. One partner is the artist and they are given a blank piece of paper. The other partner is given a written description of the multi-store model of memory. They have to explain the model and the other partner has to draw it. Without showing the drawing, once one partner has finished, they can swap roles. Once both have had a try, they can compare their answers with the model posted on the second page of the activity.</p> <p><b>Video Activity</b> (see page 10-11)            Students watch <a href="#">this video</a> and answer some questions. This helps them acquire the necessary content to target the learning standards. When you go over the questions, make sure that you end with the strength “easy to test”. This will transition very well to the next activity.</p> <p><b>Experiment Replication Activity – Peterson and Peterson</b> (see page 12-13)            Students work in pairs to conduct short-term duration memory tests on one another. Then, students receive a copy of the study’s summary. The goal is to compare their results with the ones obtained in the original study.</p>
<b>C</b> Check-in	<p><b>Fill-in-the-Blanks Worksheet</b> (see page 14)            Students complete the worksheet to check their understanding of the content covered.</p> <p><b>Back to the Think-Pair-Share</b>            Students take a look at the answer provided to the Think-Pair-Share question in the hook and complement it with the content learned through the different activities.</p>
<b>E</b> Extend	<p><b>Critical Thinking Extension</b>            Students are encouraged to think about the role of emotion in memory.</p>
<b>R</b> Reflect	<p><b>Why Are We Learning About Memory Formation and how can we improve it?</b>            Students reflect on the potential value in learning about how memories are made. They also think about the different ways of improving they memory and may watch this TED Talk: <a href="#">Feats of Memory Anyone Can Do</a></p>

<b>Lesson Plan – Day 2</b>	
<b>C</b> onsolidate	<b>Escape the Memory Palace</b> (see page 15-17) The aim of this activity is to review the content covered previously and identify the topic for today's lesson: Types of Memory.
<b>H</b> ook	
<b>A</b> ctivity	<b>Distinguish between implicit and explicit memory</b> Students take notes on a mini lecture about implicit and explicit memory, based on the information presented <a href="#">here</a> .
<b>C</b> heck-in	<b>“What Type of Memory is it?” Worksheet</b> (see page 18) Students complete the worksheet to identify the types of memory discussed.
<b>E</b> xtend	<b>Critical Thinking Extension</b> Students are encouraged to think about HM case study and identify the type of memory he did not lose after the surgery. If students have a hard time to figure this out, they may watch <a href="#">this video</a> .
<b>R</b> eflect	<b>Assessing Understanding</b> Students revisit the Key Terms Traffic Light Activity (see page 7) and assess their understanding of the concepts covered in these two lessons. They may be encouraged to make flash cards for each key word. This way, the consolidation activity for the next lesson can be playing “heads up” in pairs. One student holds up to their forehead the flash card with the key word being shown to their partner, who has to give them clues about the key word (e.g. definition).

### Resources used to elaborate this two-day lesson plan:

- Casper, H. (2007, October 2). Clive Wearing – The man with no short-term memory. [Video]. Youtube. <https://www.youtube.com/watch?app=desktop&v=Vwigmktix2Y>
- Dixon, T. (2017, February 20). C.H.A.C.E.R.: The Thematic Lesson Plan. Thematic Education. <https://www.thematic-education.com/ibpsych/2017/02/20/c-h-a-c-e-r-the-thematic-lesson-plan/>
- Dixon, T. (2019). PTSD: Student Workbook Teacher Edition. Thematic Education.
- How What Why – Quizzes, Tests & Riddles (2015, September 12). Memory Test: How Good is Your Memory? [Video]. Youtube. <https://www.youtube.com/watch?app=desktop&v=YZUjLi7zow>
- King, L. (2010). *Experience Psychology*. McGraw Hill: New York, NY.
- McLeod, S. A. (2018). Peterson and Peterson (1959). Simply Psychology. [www.simplypsychology.org/peterson-peterson.html](http://www.simplypsychology.org/peterson-peterson.html)
- Peterson, L., & Peterson, M. J. (1959). Short-term retention of individual verbal items. *Journal of Experimental Psychology*, 58(3), 193–198. <https://doi.org/10.1037/h0049234>
- Psychology Unlocked. (2016, November 27). Atkinson and Shiffrin's Multi-Store Model of Memory. [Video]. Youtube. [https://www.youtube.com/watch?app=desktop&v=7G9IK\\_mUmRE](https://www.youtube.com/watch?app=desktop&v=7G9IK_mUmRE)
- Prera, A (2020, October 26). Implicit and explicit memory. Simply Psychology. [www.simplypsychology.org/implicit-versus-explicit-memory.html](http://www.simplypsychology.org/implicit-versus-explicit-memory.html)
- Ted (2012, May 10). Feats of memory anyone can do. [Video]. Youtube. <https://www.youtube.com/watch?app=desktop&v=U6PoUg7jXsA>
- TED-Ed. (2014, August 26). What happens when you remove the hippocampus? [Video]. Youtube. <https://www.youtube.com/watch?app=desktop&v=KkaXNvzE4pk>



## KEY TERMS TRAFFIC LIGHTS ACTIVITY

Use colored pencils or highlighters. Color the boxes below based on how well you know the key term.

- **Green** = you know it and could explain it to someone else
- **Yellow** = you think you know it, but you're not 100% confident
- **Red** = you don't know it

Term	Before we begin	End of lesson 2
Memory		
Registration (encoding)		
Storage		
Retrieval		
Sensory memory (store)		
Short-term memory (store)		
Long-term memory (store)		
Rehearsal		
Transfer		
Attention		
Control processes		
Multi-store Model of Memory		
Declarative (explicit) memory		
Procedural (implicit) memory		

*adapted from an activity created by Dixon (2019)*



## BACK-TO-BACK ACTIVITY

### **PARTNER 1 (THE ARTIST)**

*Pay attention to the instructions given by your partner. Your goal is to draw how memories are formed using 8 key-terms (including a title).*

### **PARTNER 2 (THE INSTRUCTOR)**

*You need to explain the following information to your partner so they can diagram how memories are formed. Your partner has to diagram the multi-store model using only 8 key terms (including a title).*

#### **The Multi-Store Model of Memory**

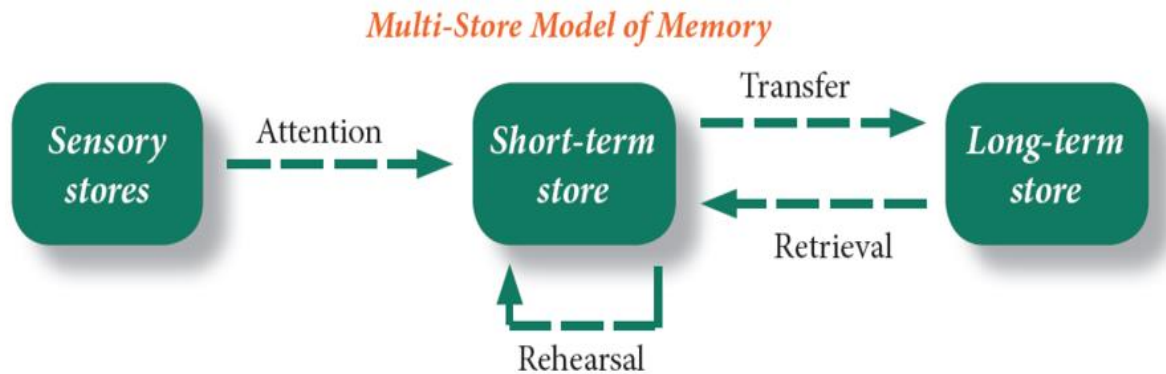
Our memories aren't all located in one single space in our minds – we store our memories in three distinct stores. These are the sensory store, the short-term store and the long-term store.

The sensory store is where we keep information from our senses (sights, sounds, smells, tastes, etc.) If we pay attention to information that enters our sensory store, it will move into our short-term store. Attention is one of the control processes that is responsible for the transfer of memory from one store to another.

Once information is in our short-term store, it will only be transferred to our long-term store if we rehearse the information over and over. If we rehearse the information, it will transfer to the long-term store.

We can bring information back from our long-term store into our short-term store through a process called retrieval. This is how we recall information when we need it.

**What are some similarities and differences between your drawing and this model?**



*The MSM aims to illustrate how memories are formed through the interaction of memory stores and control processes (cognitive processes that control the flow of information from one store to another, i.e. attention, rehearsal, transfer, and retrieval)*

**Dixon (2019)**



## VIDEO ACTIVITY

Watch [this video](#) and answer the following questions:

**1. How does the APA Dictionary of Psychology define memory?**

**2. What are the three commonly agreed processes of memory? Define each one of them.**

- 1.
- 2.
- 3.

**3. What's another name for the Multi-Store Model of Memory (MSM)?**

**4. Who proposed the MSM in 1968?**

**5. What is sensory memory?**

**6. What is short-term memory?**

7. What is long-term memory?

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8. Fill in the following table:

	Duration	Capacity
Sensory memory		
Short-term memory		
Long-term memory		

9. Draw a diagram of the MSM.

10. What are strengths and weaknesses of the MSM?

Strengths	Weaknesses

## EXPERIMENT REPLICATION ACTIVITY – PETERSON AND PETERSON

- You and your partner are going to test each other's memory. One partner says one trigram (a consonant triplet) for the other to remember.
- There are three trigrams for each of the different time delays. So, you need to conduct four tests one at a time for each time delay (24 tests in total).
- You need to make a check mark (✓) if they remember the trigram correctly, or a cross (x) if they get it incorrect.
- During the time delay, give your partner a random three-digit number (e.g. 349, 541, 982). They have to count backwards in threes out loud for the duration of the time delay before answering with the trigram.
- You need to make sure you are timing the delay and tell them when to stop counting and recall the trigram.
  - 0 seconds = repeat the trigram immediately.
  - A good idea would be to prepare them ahead of time and write in the table provided.
- Go through the time delays four times (24 trigrams in total). What % was at each time interval? (0, 25%, 50%, 75%, 100%).



*This experiment is designed to test the duration of the short-term store. It is really important that you follow the instructions carefully and ask for clarification if you're not sure.*

Participant One's Scorecard (Name) =							
Time Delay	Trigram 1	✓ x	Trigram 2	✓ x	Trigram 3	✓ x	% Correct (0, 33%, 66%, 100%)
0 secs delay	JKR		KBV		LKX		
6 secs delay	HKT		RNB		MVR		
12 secs delay	RTB		NVC		KMH		
18 secs delay	RDF		RGJ		KJT		
24 secs delay	BNZ		GBN		JHN		

Participant Two's Scorecard (Name) =							
Time Delay	Trigram 1	✓ x	Trigram 2	✓ x	Trigram 3	✓ x	% Correct (0, 33%, 66%, 100%)
0 secs delay	QKL		KMN		TKL		
6 secs delay	QNM		KSD		TRN		
12 secs delay	SZP		PLR		KGV		
18 secs delay	WDX		QZX		KLR		
24 secs delay	RFC		RPK		KLR		



# SUMMARY OF PETERSON AND PETERSON ' S STUDY

*Read the following summary written by McLeod (2018) and answer the questions below.*

**Aim** - To investigate the duration of short-term memory.

## Procedure

- 24 psychology students were asked to recall trigrams (meaningless three-consonant syllables), such as TGH, CLS.
- The trigrams were presented one at a time and had to be recalled after intervals of 3, 6, 9, 12, 15 or 18 seconds respectively for each trial. No two successive trigrams contained any of the same letters.
- After hearing a trigram, participants were asked to count backwards in threes or fours from a specified random number until they saw a red light appear (then they recalled the trigram). The purpose was to prevent rehearsal.

## Findings

- The results showed that the longer each student had to count backwards, the less well they were able to recall the trigram accurately.
- After 3 seconds 80% of the trigrams were recalled correctly.
- After 6 seconds this fell to 50%.
- After 18 seconds less than 10% of the trigrams were recalled correctly.

## Conclusion

Short-term memory has a limited duration (of about 18 seconds) when rehearsal is prevented. It is thought that this information is lost from short-term memory from trace decay.

## Questions

Must have an answer to this question: How do the findings of this study compare to the results you obtained in the replication of the study?

Amazing if you can answer these questions:

1. Why is the backwards counting necessary to test short-term duration?
2. How did Peterson and Peterson show the duration of the short-term store?
3. What is the research method of the study conducted by Peterson and Peterson?
4. What are some strengths and weaknesses of the study conducted by Peterson and Peterson?

## FILL-IN THE BLANKS ACTIVITY

*Use the MSM claims and word bank provided to fill in the blanks:*

While explaining PTSD, I tell you that next class there will be a quiz on it. Therefore, you pay \_\_\_\_\_ . The explained information (what you see projected and what you hear me say) goes into the \_\_\_\_\_ store. By paying attention to the information, it is transferred to the \_\_\_\_\_ store. You write down the information in your notes. This could be the \_\_\_\_\_ since you are going over the information again. You participate in an activity where you need to help a classmate understand what PTSD means. So, you are likely to \_\_\_\_\_ the information from the \_\_\_\_\_ to \_\_\_\_\_ . By explaining, you are \_\_\_\_\_ the information again. The more times you repeat the retrieval-rehearsal process, the stronger your \_\_\_\_\_ will be, and the better you will remember the information.

*short-term store*

*long-term store*

*memory trace*

*rehearsing*

*rehearsal*

*sensory store*

*retrieve*

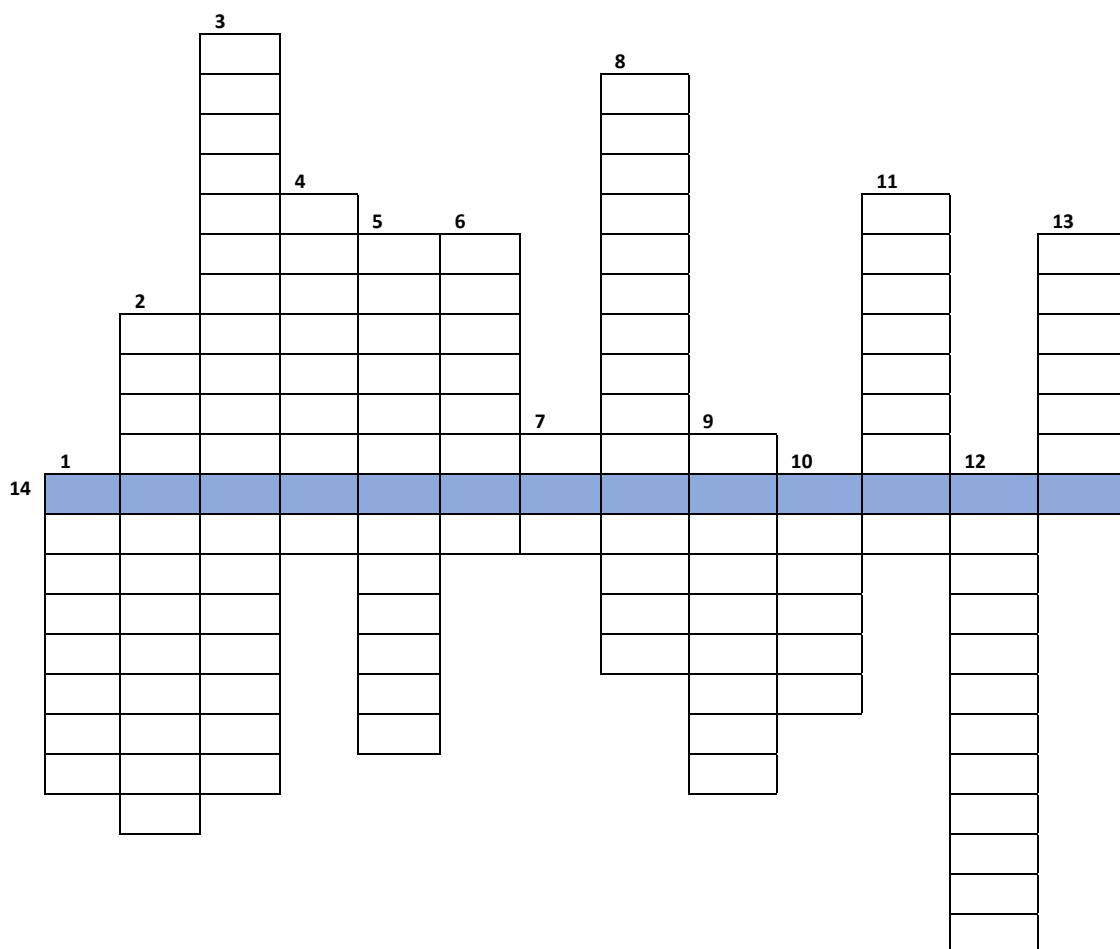
*short-term store*

*attention*

## ESCAPE THE MEMORY PALACE

The classroom may be organized into different stations and students may circulate between the different stations in groups or individually. Alternatively, you may give students the tasks from all the stations and they figure out a strategy to solve them.

**Complete the following crossword based on the clues gathered from each station. Your goal is to find the topic of today's lesson (14 across).**



## STATION ONE



Watch [this video](#) or read [this article](#).

Answer the following questions:

1. What happened to Clive Wearing?
2. What was he diagnosed with?
3. What are some symptoms he experienced?
4. What control process in the MSM impeded Clive from creating new memories?

Write the answer to question 4 in the crossword (1 down).

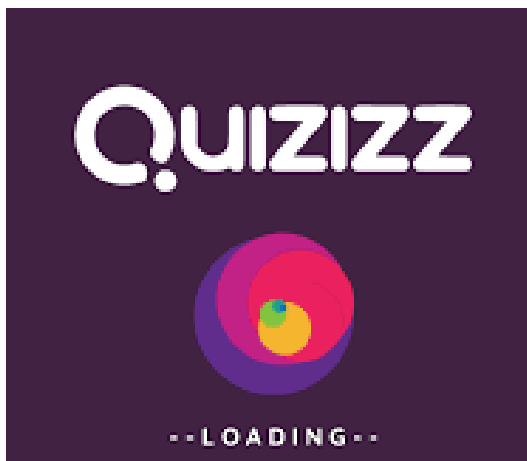
## STATION TWO



In 1953, a young man had brain surgery to cure his severe epilepsy. This surgery involved removing the hippocampus. After the surgery, the epileptic seizures stopped, but he was unable to make new memories. However, he still had a lot of memories from before his surgery, which suggests that the long-term memory store was unaffected. But he could no longer add to it, suggesting that the hippocampus may play a role in transferring information from short-term memory store to the long-term memory store. He died in 2008 and his real name was revealed to be YNRHE OAIOLMSN.

Unscramble the letters and figure out his first and last name. Add it to the crossword (2 down).

## STATION THREE

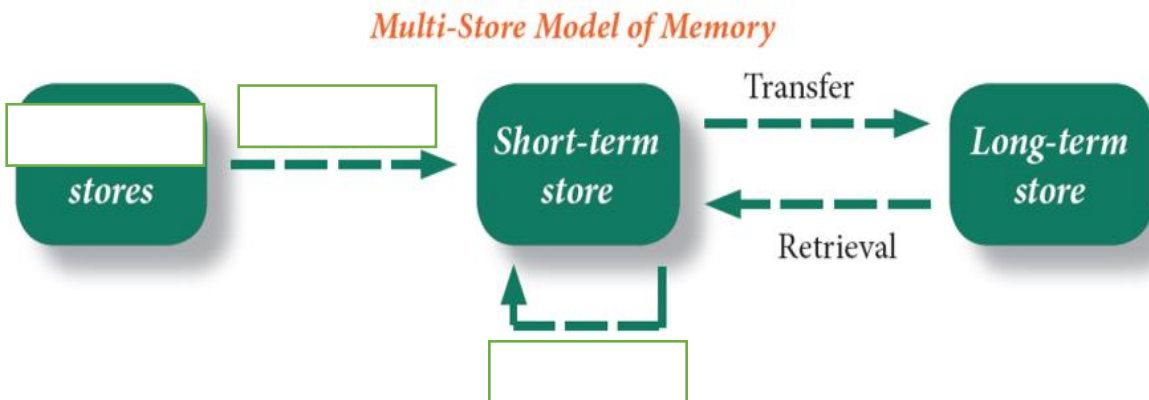


Play [this quizizz](#) and keep track of all the correct answers. You'll need them to complete the following places in the crossword:

- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 10.
- 12.

**STATION FOUR**

Label the first store and the two control processes that are missing in the diagram. Then, complete the following places in the crossword 9, 11 and 13.



## WHAT TYPE OF MEMORY IS IT?

***Read each statement below and then state what type of memory is being used.***

1. Susie is baking blueberry muffins and goes through the following steps: she preheats the oven, mixes all the ingredients in the order in which they are presented, greases the muffin pan, places the batter in separate cups, places the pan in the oven and then sets the timer.
2. In school, John is asked to name the first president of the United States and he answers, "George Washington".
3. Johanna is giving a speech in her Speech class about her most memorable birthday, which was her Sweet 16 birthday party.
4. Rebecca goes into a restaurant with her 5-year-old niece and sits down. The niece seems fidgety and wants to eat because she is so hungry. Rebecca explains to her that they need to wait to order. She knows since this is a not a fast-food restaurant that they must wait first for the server to bring them some menus. Next, they have to give a drink order and then when the server comes back, they need to give him/her their dinner order. Salads will be brought out, and when they are finished with the salads, their dinners will be brought to the table. Finally, they will finish their meal with dessert.

*activity created by King (2010)*