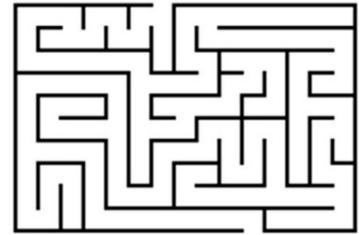
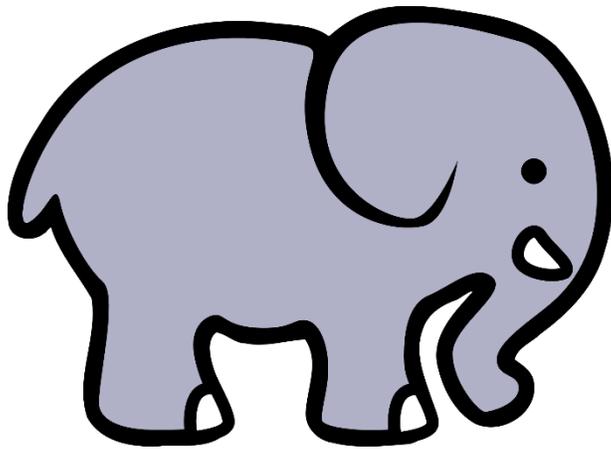


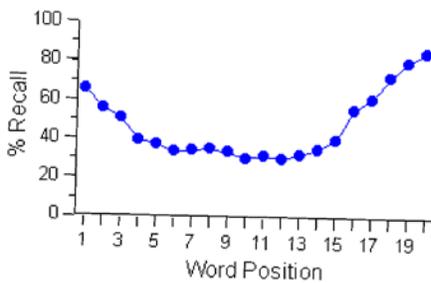
Unit 5

Memory and Cognition



ZITS

BY JERRY SCOTT AND JIM BORGMA



Essential Questions

- How do psychologists describe the human memory system?
- How do sensory memory, short-term memory, and long-term memory work, and what are their capacities and durations?
- What is the difference between implicit and explicit memories, and how does this relate to processing?
- What are some effortful processing strategies that can help us remember new information?
- How do brain structures play a role in memory processing?
- How do emotions affect our memory processing?
- How do external cues, internal emotions, and order of appearance influence memory retrieval?
- Why do we forget?
- How does misinformation, imagination, and source amnesia influence our memory construction?
- How reliable are eyewitness descriptions, and why are reports of repressed and recovered memories so hotly debated?
- How can you use memory research findings to do better in this and other courses?
- What is cognition, and what are the functions of concepts?
- What cognitive strategies assist our problem solving, and what obstacles hinder it?
- How can representativeness and availability heuristics, overconfidence, belief perseverance, and framing influence our decisions and judgments?
- What are the structural components of language?
- What are the milestones in language development?
- How do we acquire language?

Key Terms, Concepts and Contributors

<p>MODULE 31: Memory Encoding Storage Retrieval Parallel processing Sensory memory Short-term memory Long-term memory Working memory Explicit memory Effortful processing Implicit memory Automatic processing Iconic memory Echoic memory Chunking Mnemonic devices Spacing effect Testing effect Shallow processing Deep processing</p>	<p>MODULE 32: Hippocampus Cerebellum Flashbulb memory Long-term potentiation Recall Recognition Relearning Priming Context-dependent memory State-dependent memory Mood-congruent memory Serial position effect Primacy effect Recency effect</p> <p>MODULE 33: Anterograde amnesia Retrograde amnesia Encoding failure Decay theory Proactive interference Retroactive interference Motivated forgetting Repression Misinformation effect Source amnesia Déjà vu Memory reconstruction</p>	<p>MODULE 34: Cognition Concept Prototype</p> <p>MODULE 35: Algorithm Heuristic Insight Confirmation bias Mental set Intuition Representativeness heuristic Availability heuristic Overconfidence Belief perseverance Framing</p>	<p>MODULE 36: Language Phonemes Morphemes Grammar Receptive language Babbling stage One-word stage Two-word stage Telegraphic speech Language acquisition device Critical periods Aphasia Wernicke’s area Broca’s area Linguistic determinism</p> <p>KEY CONTRIBUTORS: Hermann Ebbinghaus Elizabeth Loftus Noam Chomsky Benjamin Whorf</p>
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Name: _____

MEMORY: A PREVIEW

Directions: You need to visit all 10 stations during the class period. Record your responses on this sheet.

STATION #1: Which states were you able to identify by their shapes?

STATION #2: What's wrong with Matt Damon's character?

STATION #3: Which did you choose to construct? How easily was it for you to remember how to do this?

STATION #4: Your answer? Why do you know this?

STATION #5: Which logos do you recognize?

STATION #6: Description of 1st day of freshman year.

STATION #7: What is exceptional about Stephen Wiltshire?

STATION #8: How many of those people can you name?

STATION #9: Your memory drawing:

STATION #10: What are the names of the 7 Dwarves?

REFLECTION QUESTIONS:

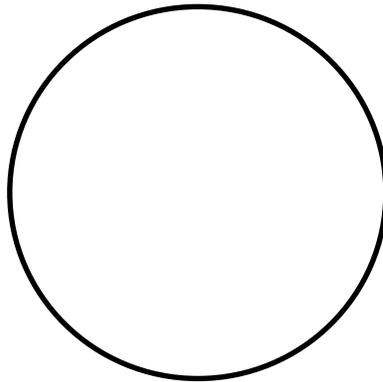
1. How easy were today's memory tasks for you? Were some easier than others? Why?
2. Based on today's activity, what predictions can you make about our next unit - Memory & Cognition?

RECOGNITION IS EASY, RECALL IS HARD

Can you tell which of the following is the real penny?



Now, draw a picture of the US quarter in the circle below. Try to get as many details as you can.



Whose face did you draw on the quarter?

Which of the two activities was easier, picking out the correct penny or drawing the details of a quarter from scratch? Why?

RECOGNITION IS EASY

The human brain was “designed,” through millions of years of natural selection and evolution, to recognize things quickly. By contrast, recalling memories, i.e., retrieving them without perceptual support, must not have been as crucial for survival, because our brains are much worse at that. Remember how our long-term memory works: perceptions enter through our sensory systems, and their signals reach the brain, and cause complex patterns of neural activity. ...Over time, connections between neural patterns develop in such a way that activating one pattern activates the other. Roughly speaking, each pattern of neural activity constitutes a different memory. If a perception comes in that is similar to an earlier one and the context is close enough, it easily stimulates a similar pattern of neural activity, resulting in a sense of recognition. Recognition is essentially perception and long-term memory working together. As a result, we assess situations very quickly. Our distant ancestors on the East African savannah had only a second or two to decide whether an animal emerging from the tall grasses was something they would regard as food or something that would regard them as food (see Fig. 9.1). Their survival depended on it. Similarly, people recognize human faces very quickly—usually in a fraction a second (see Fig. 9.2).



FIGURE 9.1 Early hominids had to recognize quickly whether animals they spotted were prey or predators.



FIGURE 9.2 How long did it take you to recognize these faces?

That explains why, when presented with faces we have not seen before and asked if they are familiar, we don't spend a long time searching through our memories to try to see if that face is stored in there somewhere. There is no search. A new face stimulates a pattern of neural activity that has not been activated before, so no sense of recognition results. Of course, a new face may be so similar to a face we have seen that it triggers a misrecognition, or it may be just similar enough that the neural pattern it activates triggers a familiar pattern, causing a feeling that the new face reminds us of someone we know.

RECALL IS HARD

In contrast, recall is long-term memory reactivating old neural patterns without immediate similar perceptual input. That is much harder than reactivating a neural pattern with the same or similar perceptions. People *can* recall memories, so it obviously *is* possible for other neural patterns to reactivate a pattern of neural activity corresponding to a memory. However, the coordination and timing required to recall a memory increase the likelihood that the wrong pattern or only part of the right pattern will be activated, resulting in a failure to recall. Whatever the evolutionary reasons, our brain did not evolve to recall facts. Many schoolchildren dislike history class because it demands that they remember facts, such as the year the English Magna Carta was signed, the capital city of Argentina, and the names of all 50 U.S. states. Their dislike is not surprising; the human brain is not well suited for that sort of task.

Give me one example of where you have had to use each type of retrieval in your day-to-day life:

Recognition:

Recall:

Explanations for Forgetting



Reasons Why We Forget

By [Kendra Cherry](#)

What are some of the major reasons why we forget information? One of today's best known memory researchers, Elizabeth Loftus, has identified four major reasons why people forget: retrieval failure, interference, failure to store, and motivated forgetting.

1. Retrieval Failure

Have you ever felt like a piece of information has just vanished from memory? Or maybe you know that it's there, you just can't seem to find it. The inability to retrieve a memory is one of the most common causes of forgetting.

So why are we often unable to retrieve information from memory. One possible explanation retrieval failure is known as **decay theory**. According to this theory, a memory trace is created every time a new theory is formed. Decay theory suggests that over time, these memory traces begin to fade and disappear. If information is not retrieved and rehearsed, it will eventually be lost.

One problem with this theory, however, is that research has demonstrated that even memories which have not been rehearsed or remembered are remarkably stable in long-term memory.

2. Interference

Another theory known as **interference theory** suggests that some memories compete and interfere with other memories. When information is very similar to other information that was previously stored in memory, interference is more likely to occur.

There are two basic types of interference:

Proactive interference is when an old memory makes it more difficult or impossible to remember a new memory.

Retroactive interference occurs when new information interferes with your ability to remember previously learned information.

3. Failure to Store

Sometimes, losing information has less to do with forgetting and more to do with the fact that it never made it into long-term memory in the first place. *Encoding failures* sometimes prevent information from entering long-term memory.

In one well-known experiment, researchers asked participants to identify the correct U.S. penny out of a group of incorrect pennies (Nickerson & Adams). Try doing this experiment yourself by attempting to draw a penny from memory, and then compare your results to an actual penny.

How well did you do? Chances are that you were able to remember the shape and color, but you probably forgot other minor details. The reason for this is that only details necessary for distinguishing pennies from other coins were encoded into your long-term memory.

4. Motivated Forgetting

Sometimes, we may actively work to forget memories, especially those of traumatic or disturbing events or experiences. The two basic forms of motivated forgetting are: suppression, a conscious form of forgetting, and repression, an unconscious form of forgetting.

However, the concept of repressed memories is not universally accepted by all psychologists. One of the problems with repressed memories is that it is difficult, if not impossible, to scientifically study whether or not a memory has been repressed. Also note that mental activities such as rehearsal and remembering are important ways of strengthening a memory, and memories of painful or traumatic life events are far less likely to be remembered, discussed, or rehearsed.

Other problems with forgetting...

Have you ever felt like you knew the answer to a question, but couldn't quite remember the information? This phenomenon is known as a 'tip of the tongue' experience. You might feel certain that this information is stored somewhere in your memory, but you are unable to access and retrieve it.

While it may be irritating or even troubling, research has shown that these experiences are extremely common, typically occurring at least once each week for most younger individuals and two to four times per week for elderly adults (Schacter, 2001). In many cases, people can even remember details such as the first letter that the word starts with. (Brown, 1991).

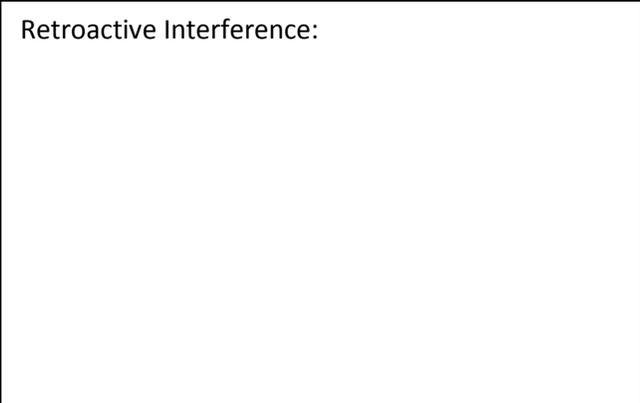
Explanations for Forgetting

Forgetting is an everyday occurrence for each of us. Use the following tasks and article to prepare yourself and your partner for a race for extra credit at the end of the period.

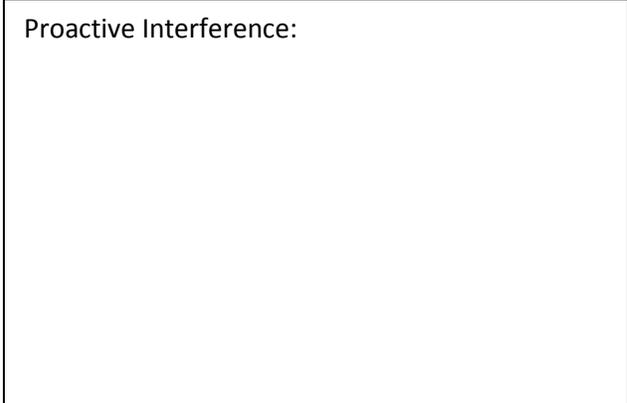
To be completed after reading 

1. Make a list of three things you've forgotten recently:
 - a. (Type of forgetting:)
 - b. (Type of forgetting:)
 - c. (Type of forgetting:)
2. Now, read the article of the flip side of this sheet about forgetting.
3. Then, apply the types of forgetting to your examples above by placing the type in the parentheses.
4. Next, draw a scenario that represents the two types of interference:

Retroactive Interference:



Proactive Interference:



5. Create a memory device to help you remember these two different types of interference (ie. an analogy, mnemonic, rhyme, etc.)
6. Finally, explain your beliefs on motivated forgetting. Do you believe we can repress or suppress memories? Why or why not?

** Remember, you need to be able to define and apply these terms for the race at the end of the period.

MEMORY LOSS CASE STUDIES

Case
1

Patient H.M. had brain surgery when he was 27 yrs. old. The surgery involved removal of part of the brain known as the hippocampus to alleviate the severe symptoms of epilepsy. Although the surgery controlled the epileptic seizures H.M. suffered serious and debilitating memory impairment as a side effect.

His short-term memory was normal but he was completely unable to transfer any new information into his long-term memory. He showed almost no knowledge of current affairs because he forgot any news item as soon as he had read about it; he knew nothing of recent family events including moving house and the death of his father.

Despite being able to remember people he had known long ago he was never able to store information about new people he encountered and they remained forever complete strangers to him.

What type of memory loss is H.M. suffering from? _____

How do you know? _____

Case
2

Patient K.C. has normal intelligence and relatively well-preserved perceptual, linguistic, short-term memory, and reasoning abilities. He possesses some incomplete general knowledge about his autobiographical past. He does not remember a single personal event or happening from any time of his life. He has some preserved expert knowledge related to the work he did for 3 years before the onset of amnesia, although he has no personal recollections from that period.

What type of memory loss is K.C. suffering from? _____

How do you know? _____

Case
3

Patient C.W. was a 58-year-old man presenting to the emergency department after an unwitnessed fall from a second-story balcony. On admission, the patient had a blood alcohol level of 0.2 percent and a Glasgow coma scale score of 9 (range: 3-15) and he required intubation to protect his airway. After stabilization, a computed tomography (CT) of the head was ordered, which showed brain deterioration; no neurosurgical intervention was needed.

A psychiatry consult was called due to the patient's "confusion and agitation." During our initial evaluation, the patient denied mood disturbance, auditory/visual hallucinations, delusions, or lethality; however, he did make up many stories including the death of President Obama and his recent arrival from California that morning.

What type of memory loss is C.W. suffering from? _____

How do you know? _____

Case
4

Patient L. R. was brought to neurological evaluation by her brother because of a 3 year history of memory impairment. She had lived alone and maintained her own home and financial affairs since the death of her husband a few years ago. The brother had begun to notice gradually worsening memory impairment and difficulty finding words, but the patient became angry at the suggestion that she may have a progressive impairment. Others had noted decline in housekeeping and financial affairs, but she had no complaints.

What type of memory loss is L.R. suffering from? _____

How do you know? _____

Case
5

Patient K.W. has been having getting into frequent conflicts with his childhood friend, Bob, because lately he has begun telling other mutual friends detailed stories of trips he took as a child. His friend Bob is very upset because K.W. did not actually take these trips, but rather heard the detailed stories from his friend Bob years ago and now K.W. is not sure if those are his own personal memories or if they were Bob's.

What type of memory loss is K.W. suffering from? _____

How do you know? _____

Memory Loss Terms:

Retrograde Amnesia

Source Amnesia

Anterograde Amnesia

Alzheimer's disease

Korsakoff's syndrome

Repressed Memories are a Controversial Subject

Sunday, October 20th, 2013

In the 1980s and 1990s there seemed to be a surge of patients who reported to their psychiatrists that they had repressed memories, and many of them reported their parents had abused them as children and they blocked it out. It brought many experts to ask the questions: Are repressed memories of child abuse common? Can these old claims be substantiated? Are these memories true?

It was later found that many of these claims were placed into the minds of the patients by their psychiatrists, and the abuse never actually happened. The false memories were coached into the minds of the patients, and they actually believed they did happen.

There is no more a haunting concept in psychology than that of repressed memories, or dissociative amnesia. When a tragic event occurs the mind often pushes the memory back to a dark and recessed corner of the unconscious to protect it. The memory may come back to the surface, in the conscious mind, at some time but it may not be the same as the actual event.

A landmark case in Redwood City, California in 1990 involved 51-year-old George Franklin Sr., who was accused of murdering 8-yr-old Susan Kay Nason in 1969. Franklin's daughter was 8 at the time as well, and provided evidence that her father murdered the young girl. According to his daughter, Eileen, she had repressed the memory of the event for over 20 years and it began to come back to her in flashbacks while she was playing with her 2-yr-old son, Aaron and her 5-yr-old daughter, Jessica.

She recalled the look of betrayal in Susie's eyes just before the murder, and that her father had assaulted the girl in the back of a van. She recalled the girl struggling and pleading with him to stop. Her memories became more vivid with time, and she described to the jury her father picking up a large rock and lifting it above his head, and then Susie screaming. Eileen walked over to Susie's body, covered in blood, and noted the silver ring smashed on her finger.

Eileen reported her memories to her therapist and several family members, and to the San Mateo County district attorney's office. The jury believed her and her father was convicted of murder. It was the first time an American had been convicted on the basis of repressed memories.

Were Eileen's memories real, and did she actually witness the death of her friend? Although her relaying of the story was very detailed and sounded authentic, all things she reported could be found in the newspapers and news during the timeframe. To add to the questions, it seemed that Eileen's story changed over time. In one statement her sister, Janice, was with them. In another statement there was no mention of Janice. At one point she said she didn't realize Susie was missing until after school, and another time their father was driving her and her sister to school when he stopped to pick up Susie. Some or all of the memories could have been real, but there is no way to verify the facts. If Eileen's memory is not authentic, where else might all those details come from?

A number of the claims that arose in the 80s and 90s were retracted after it was found the victim's therapists swayed their memories by various psychological techniques. The subject of dissociative amnesia has been a hotly contested area of psychology for some time.

Researchers have been trying to validate repressed memories over the centuries but have not been able to authenticate any claims. According to one Harvard researcher, the challenge falls upon anyone who believes that repressed memory is real to explain its absence for thousands of years. Researchers from Brown University take the opposite tack and conclude, Literature can provide important information about human experience, but it cannot prove or disprove traumatic amnesia any more than it can prove or disprove the existence of bacteria or dragons. Literary passages and modern scientific data do reveal descriptions and data, respectively, that depict dissociative amnesia as a naturally occurring traumatic sequel.

The Controversy over Repressed Memories

The existence of repressed memories is a controversial topic in psychology; some studies have concluded that repression can occur in victims of trauma while others dispute it. According to the American Psychological Association, it is not currently possible to distinguish a true repressed memory from a false one without corroborating evidence. Some research indicates that memories of child sexual abuse and other traumatic incidents may be forgotten.

Studies of subjective reports of memory show that memories of highly significant events are unusually accurate and stable over time. The imprints of traumatic experiences appear to be qualitatively different from those of nontraumatic events. Traumatic memories may be coded differently than ordinary event memories, possibly because of alterations in attentional focusing or the fact that extreme emotional arousal interferes with the memory functions of the hippocampus.

Although research on repressed memory is limited, a few studies have suggested that memories of trauma that are forgotten and later recalled have a similar accuracy rate as trauma memories that had not been forgotten. There has also been significant questioning of the reality of repressed memories. Based on considerable evidence, traumatic memories tend to be intrusive instead of repressed. In other words, rather than being pushed out of consciousness, these memories are difficult to forget. Elizabeth Loftus and Melvin Guyer have criticized one case, recorded by David Corwin, that is held up as definitive proof of the reality of repressed memories. According to their criticism, the case does not prove repression because it ignores the context of the original complaint and falsely presents the sexual abuse as unequivocal and true when, in reality, there was no definitive proof. As a result, the existence of repressed memory recovery has not been accepted by mainstream psychology nor unequivocally proven to exist, and some experts in the field of human memory feel that no credible scientific support exists for the notions of repressed or recovered memories. One research report states that a distinction should be made between spontaneously recovered memories and memories recovered during suggestions in therapy.

In one sentence, summarize the controversy surrounding repressed memories.

Provide one piece of textual evidence that supports what you've summarized.

CONNECTING THE TEXT TO OTHER TEXTS		CONNECTING THE TEXT TO YOURSELF		CONNECTING THE TEXT TO THE WORLD	
The text said...	This reminds me of...	The text said...	This reminds me of...	The text said...	This reminds me of...

THE WAYS WE THINK...



Watch the following video and use your textbook to complete the chart on this side of the page...

<http://tinyurl.com/m8d2zfm>

<http://tinyurl.com/ldqzex8> or go to class website to access these videos

Cognition Term	Definition
1. Algorithm	
2. Availability Heuristic	
3. Belief Perseverance	
4. Cognition	
5. Concepts	
6. Confirmation Bias	
7. Fixation	
8. Framing	
9. Functional Fixedness	
10. Heuristics	
11. Insight	
12. Mental Set	
13. Overconfidence	
14. Prototypes	
15. Representative Heuristics	

1. In groups, discuss your definitions and amend yours if necessary.
2. Come up with examples for each of the 15 terms.
3. Next, your group will be given a piece of butcher paper and assigned ONE term.
 - On the butcher paper provided:
 1. DRAW something to represent your term WITHOUT naming the term on the top half of the paper.
 2. On the bottom half of the paper, WRITE out *a different example* of your assigned term from the one you drew WITHOUT naming the term.

Cognition Term	Example	Station # (to be used tomorrow)
1. Algorithm		
2. Availability Heuristic		
3. Belief Perseverance		
4. Cognition		
5. Concepts		
6. Confirmation Bias		
7. Fixation		
8. Framing		
9. Functional Fixedness		
10. Heuristics		
11. Insight		
12. Mental Set		
13. Overconfidence		
14. Prototypes		
15. Representative Heuristics		

Name: _____

COGNITION APPLICATIONS

BUILDING BLOCKS OF COGNITION

Come up with your own example of a **concept** (for example – chairs). What characteristics do you look for in order to categorize something into this concept?

What would your **prototype** be for this concept?

What would NOT be a good prototype? Why?

PROBLEM-SOLVING

At the end of class, Mrs. Matus asks you to get her cell phone charger out of her car. She hands you her car keys and begins getting ready for her next class. You get out to the parking lot and realize that her keys are old-school: no remote locks or starter, no panic button, no make or model that you can identify.

How could you use an **algorithm** to solve this problem?

Why is this an example of an algorithm?

How could you use a **heuristic** to solve this problem?

Why is this an example of a heuristic?

When was the last time you personally had a moment of **insight**? Describe your experience.

PROBLEMS WITH USING HEURISTICS



What assumptions would you make about this woman based on her appearance?

What would her opposite be? Draw in the box.

How does this exemplify the **representative heuristic**?

In the chart below, circle your answer to the question and explain why you chose that.

QUESTIONS & ANSWERS	EXPLANATION
Which scares you most? Flying in a plane OR Driving in a car	
Which should the government spend more money on? Homeland Security OR Traffic Safety	
Which is more dangerous? Sharks OR Toasters	

How might these be examples of the **availability heuristic**?

How can using heuristics lead to **overconfidence**?

Name: _____

ISSUES WITH PROBLEM SOLVING & MAKING JUDGMENTS

In the space below, create a cartoon illustrating **fixation**.

In the space below, create a cartoon illustrating **functional fixedness**.

In the space below, create a cartoon illustrating a **mental set**.

What do these three terms have in common?

What subtle differences exist between them?

Fixation

Functional Fixedness

Mental Set

Memory Cognition Video Project

Objective: To create a short video to help your peers remember the vocabulary words.

We often remember things better when we have a personal connection or our friends are part of the situation. So let's remember some of our vocabulary terms by creating short videos for our peers.

In groups of three, you will create a short video on one of the vocabulary words for this unit. Your video can be anywhere from 6 seconds to 60 seconds (maximum). You can use a fun free app to create your video, like Vine, Stop Motion, Flipgram, Lapse It, etc. OR you may choose an online free website like [Powtoon](#), WeVideo, or [Google Story](#). Your group can also just film an easy video on your phone & then upload it to your Google Drive.

Here are the possible terms: Have one representative see your teacher to pick your term.

automatic processing
elaborative rehearsal
echoic memory
procedural memory
serial position effect
semantic encoding
flashbulb memory
implicit memory
explicit memory

Insight
algorithm
overconfidence
fixation
framing
mental set
prototype
belief perseverance
representative heuristic

Step One: Define your term & write an example...so that you understand it! Check in with your teacher to move on to Step 2!

Step Two: Quickly plan how you will demonstrate your vocabulary word to the class in a video. Film & edit your video.

Step Three: When your video is complete upload it to your Google Drive or YouTube.

Step Four: Follow up with your teacher – you may either link the video to Google Classroom or send it to your teacher via email. Be sure to follow their directions!

Student Examples: from Cary-Grove High School

Automatic Processing: <http://goo.gl/Lgm9ES> (Google Docs Story Builder)

Spacing Effect (AP): <http://goo.gl/ZCQB7v>

Echoic Memory: <http://goo.gl/pSr3Lm> (Stop Motion)

Flashbulb Memory: <http://goo.gl/GblQe3> (Flipagram)

Terms for Extra Credit Flashcards:

Unit 5: Memory & Cognition

Sensory registers	Cocktail party phenomenon	Short term memory
Chunking	Long term memory	Tip-of-the-tongue phenomenon
Decay theory	Proactive interference	Retroactive interference
Rote rehearsal	Elaborative rehearsal	Explicit memory
Implicit memory	Semantic memory	Episodic memory
Eidetic memory	Autobiographical memory	Flashbulb memory
Memory reconstruction	Mnemonic devices	Cognition
Concept	Prototype	Algorithm
Heuristic	Insight	Confirmation bias
Mental set	Functional fixedness	Representativeness heuristic
Availability heuristic	Overconfidence	Framing
Belief bias	Belief perseverance	Serial position effect
Parallel processing	Automatic processing	Shallow processing
Deep processing	Spacing effect	Testing effect
Retrograde amnesia	Anterograde amnesia	Source amnesia
Convergent thinking	Divergent thinking	Phoneme
Morpheme	Babbling stage	One-word stage
Two-word stage	Telegraphic speech	Linguistic determinism

Pick 15 terms from the above list (or from the unit guide on the back of the packet cover) that you are least familiar/comfortable with and construct a flashcard including the following information:

1. On one side, **define** the term IN YOUR OWN WORDS. Try and keep the definition short, meaningful, and something that you can remember.
2. On the other side, **draw** a picture that demonstrates the term OR **describe** a personal example.

You may earn up to 5 points of extra credit for your 15 flashcards!

All flashcards must be turned in by the day of the unit assessment – no late flashcards will be accepted!

