

# STUDENT ENGAGEMENT: LATHER, RINSE, REPEAT

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# Welcome

- Quick introductions
  - Who, What, Where, Why
- A Little Background Information

# What do we mean by “engagement” in a class?

- Interaction
- Activity
- Involvement
- Interest
- Motivation

# Engagement can occur:

- Everywhere!
- Not just in the lecture classroom, but that's one place.
- When doing assignments.
- When interacting with other students either virtually or in the F2F environment.

# Retrieval Practice

“**Retrieval practice**” is a learning strategy where we focus on getting information **out**. Through the act of retrieval, or calling information to mind, our memory for that information is strengthened and forgetting is less likely to occur. [Pooja K. Agarwal, Ph.D.](#)

Retrieval Practice homepage

<https://www.retrievalpractice.org/>

# RETRIEVAL PRACTICE

When we teach something once, then want to do more to help students learn it better, instead of just reviewing the content, we're better off giving something like a quiz. In other words, if we do more asking students to pull concepts out of their brains, rather than continually trying to put concepts in, they will actually learn better.

Retrieval practice is **NOT THE SAME AS ASSESSMENT**. Although it can look like testing, it is a **learning strategy**, not a tool for measuring or grading students.

## USING IT WELL

### WHAT IT LOOKS LIKE

- Think-pair-share
- Low-stakes quizzes
- Flashcards
- Brain dumps

#### Include Feedback

Tell students if they got the answer right or wrong.

#### Space Your Practice

Rather than doing retrieval all at once, spread practices out over time.

#### Match Practice to Assessment

If you will assess for basic recall of facts, retrieve with those. If you will require higher-order thinking on tests, include higher-order questions during retrieval.

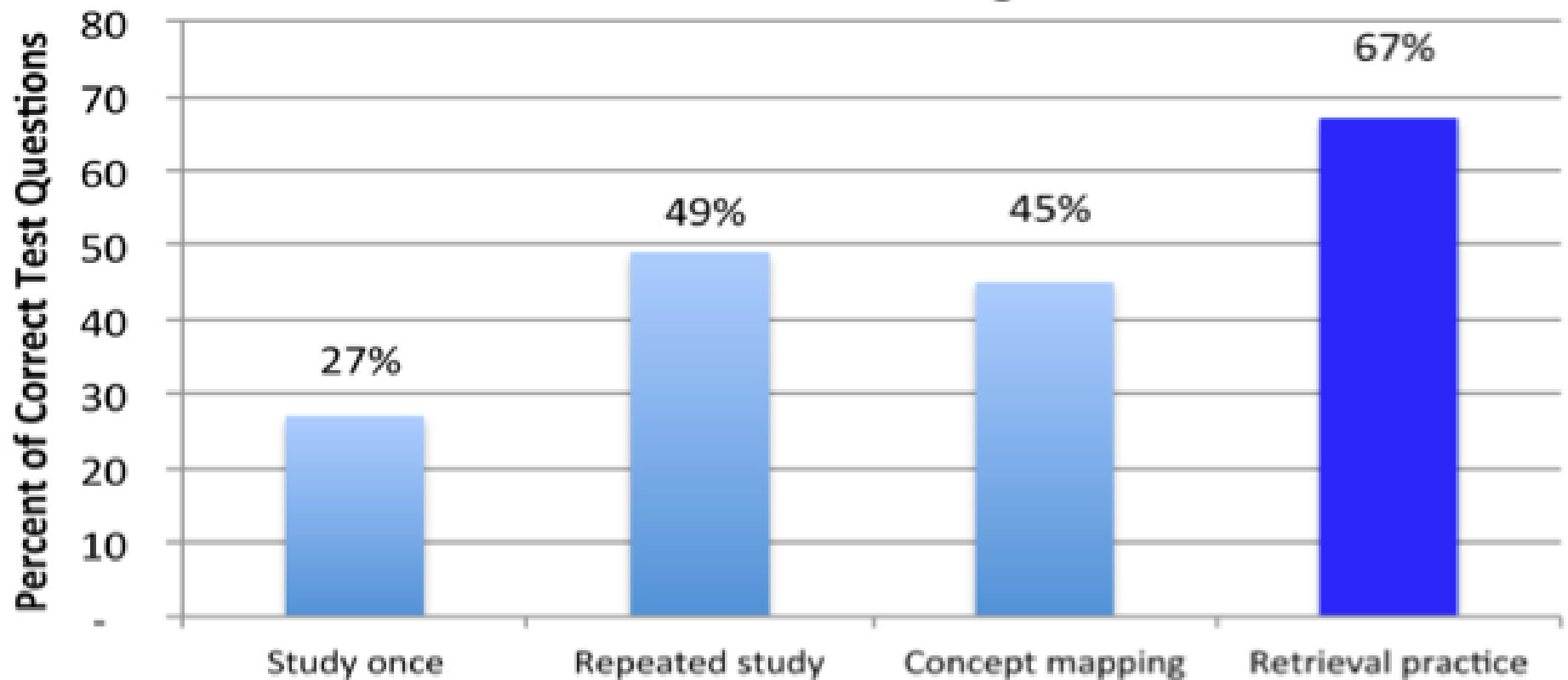


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# Why do I use retrieval practice methods?

- Next slide

## Comparison of Retrieval Practice with Other Common Learning Methods



Karpicke and Blunt, 2011



# Retrieval practice:

- Improves students' complex thinking and application skills .
- Improves students' organization of knowledge.
- Improves students' transfer of knowledge to new concepts.
- Increases flexible understanding.

Retrieval Practice is a “no-stakes” learning opportunity that increases student learning

# Think-Pair-Share

- Explain to your partner what is meant by a “no-stakes” learning opportunity.

Much of what I do in my  
classes centers around  
retrieval practice.

# Retrieval Practice in Action

- Clickers in class (beginning, during, near end)
- Think-pair-share (used several different ways)
- Brain Dump
- LearnSmart assignments
- Connect HW assignments
- Peer feedback

These tools also include metacognitive processes (more about that in a bit).

# iClickers

- I award points for my clicker questions, but only 1 or 2 points were awarded per session and not based on correct answer. (no-stakes opportunities)
- I am was gentle on scoring only needed to answer 75% of the questions to earn the point(s).
- In addition, I allow for 3-4 absences during the semester so that students aren't wanting to do make-up work.



# Polling Tools for Formative Assessment aka Student Response Systems

- Kahoot
- Quizlet
- Quizizz
- Plickers
- iClickers
- TopHat
- Echo360



C. Chloride  
D. Hydrogen

Question 9

What cellular mechanism is responsible for establishing and maintaining the resting membrane potential?

- A. Voltage gated channels
- B. The sodium-potassium pump
- C. Electrochemical gradients
- D. The Krebs cycle

Question 10

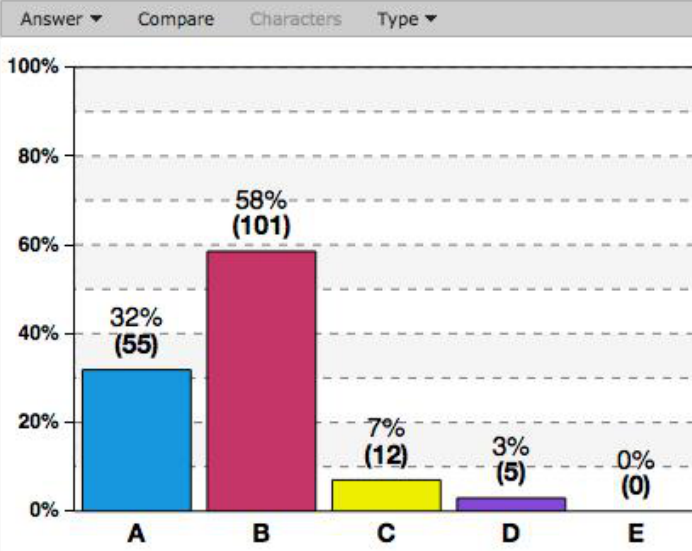
What cellular mechanism is responsible for establishing and maintaining the resting membrane potential?

- A. Voltage gated channels
- B. The sodium-potassium pump
- C. Electrochemical gradients
- D. The Krebs cycle

Question 11

View Chart

Question 10 Votes: 173



Close

View Chart

	Vote %	Votes	Points
	32%	55	0.00
	58%	101	0.00
	7%	12	0.00
	3%	5	0.00
	0%	0	0.00

# Think-Pair-Share

- When there are a lot of student choose the wrong answer, I don't tell them what the correct answer is yet.
- They do a think-pair-share – talk to your neighbor and tell them why you chose the answer you did.
- Then they vote again.

### Question 9

What cellular mechanism is responsible for establishing and maintaining the resting membrane potential?

- A. Voltage gated channels
- B. The sodium-potassium pump
- C. Electrochemical gradients
- D. The Krebs cycle

### Question 10

What cellular mechanism is responsible for establishing and maintaining the resting membrane potential?

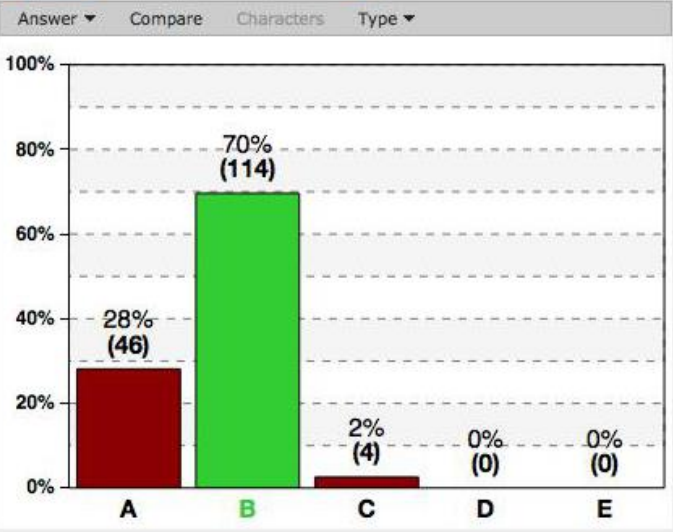
- A. Voltage gated channels
- B. The sodium-potassium pump
- C. Electrochemical gradients
- D. The Krebs cycle

### Question 11

What would happen to the membrane potential if the sodium-potassium pumps were poisoned?

### View Chart

Question 11 Votes: 164



Close

View Chart

	Vote %	Votes	Points
	28%	46	0.00
	70%	114	0.00
	2%	4	0.00
	0%	0	0.00
	0%	0	0.00

# Feedback is Very Important

- Show results and explain why the correct answer is correct
- Feedback is a critical component of retrieval practice.
- Feedback increases students' metacognition.

Let's Look at Another  
Example

Question 1

NADH generates \_\_\_\_ ATPs in the ETS whereas  $\text{FADH}_2$  generates \_\_\_\_ ATPs.

- A. 2; 3
- B. 3; 2
- C. 2; 4
- D. 4; 2

Question 2

NADH generates \_\_\_\_ ATPs in the ETS whereas  $\text{FADH}_2$  generates \_\_\_\_ ATPs.

- A. 2; 3
- B. 3; 2
- C. 2; 4
- D. 4; 2

Question 3

Question

Question

Correct

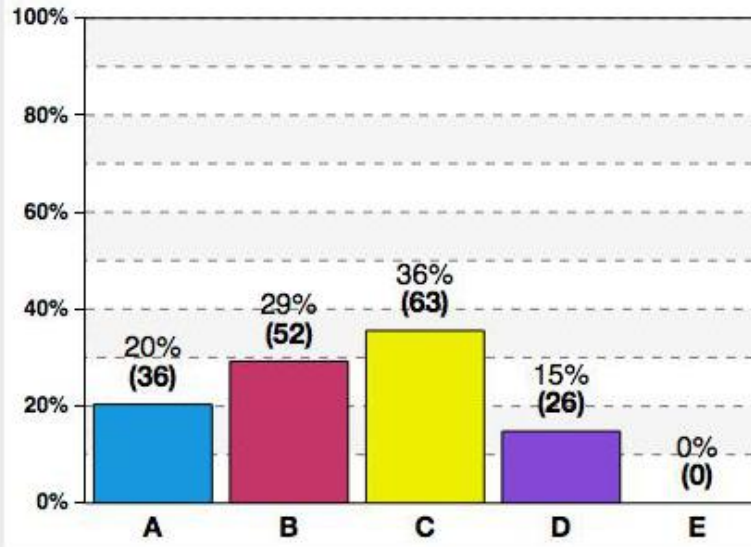
- 
- 
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- 

View Chart

Question 2

Votes: 177

Answer Compare Characters Type



Close

View Chart

%	Votes	Points
%	36	0.00
%	52	0.00
%	63	0.00
%	26	0.00
%	0	0.00

### Question 1

NADH generates \_\_\_\_\_ ATPs in the ETS whereas  $\text{FADH}_2$  generates \_\_\_\_\_ ATPs.

- A. 2; 3
- B. 3; 2
- C. 2; 4
- D. 4; 2

### Question 2

NADH generates \_\_\_\_\_ ATPs in the ETS whereas  $\text{FADH}_2$  generates \_\_\_\_\_ ATPs.

- A. 2; 3
- B. 3; 2
- C. 2; 4
- D. 4; 2

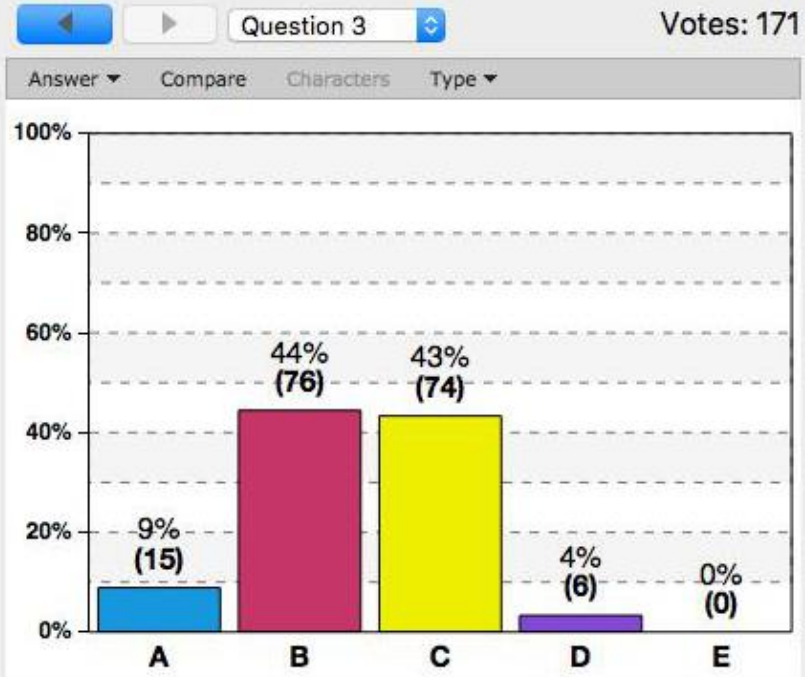
### Question 3

## Question 3

Question 3  
Correct

- 
- 
- 
- 
- 
- 

### View Chart



Close

### View Chart

Vote %	Votes	Points
9%	15	0.00
44%	76	0.00
43%	74	0.00
4%	6	0.00
0%	0	0.00

# What does this tell me?

- I need to go back over the material.



# Spaced Practice

- Return to the same question a few days later.
- “By returning to content every so often, students’ knowledge has had time to rest and be refreshed.”
- [https://www.edsurge.com/amp/news/2018-07-24-you-re-already-harnessing-the-science-of-learning-you-just-don-t-know-it?\\_\\_twitter\\_impression=true](https://www.edsurge.com/amp/news/2018-07-24-you-re-already-harnessing-the-science-of-learning-you-just-don-t-know-it?__twitter_impression=true)

Using your phone answer  
this question about retrieval  
practice.

- [p.excitem.com/s/presentation/poll?eld=04fdb6a4c  
ba515198afbc7cb3c0d3e5baff0ac3bcc36f8dc2897  
36e420b18de2](https://p.excitem.com/s/presentation/poll?eld=04fdb6a4c<br/>ba515198afbc7cb3c0d3e5baff0ac3bcc36f8dc2897<br/>36e420b18de2)

# Questions that students have trouble with often will reappear next class.

- The first few minutes of each class involve a few clicker questions.
- Usually they do quite well, but not always.
- If poor performance I revisit the topic before starting anything new.

# Metacognition

- An awareness and understanding of one's own thought processes.
- Thinking about one's thinking.

# Metacognitive Tools and Activities to Help Students Improve their learning.

- LearnSmart activities.
- Journaling after each exam.
- Brain Dumps (and evaluation of them)

# Learn Smart Question

Place the levels of organization of the body in order from least (top) to most complex.

↕ Place these in the proper order. **cognitive component**


tissues

organs

organ systems

cells

Do you know the answer?

 Read about this

I know it

Think so

Unsure

No idea

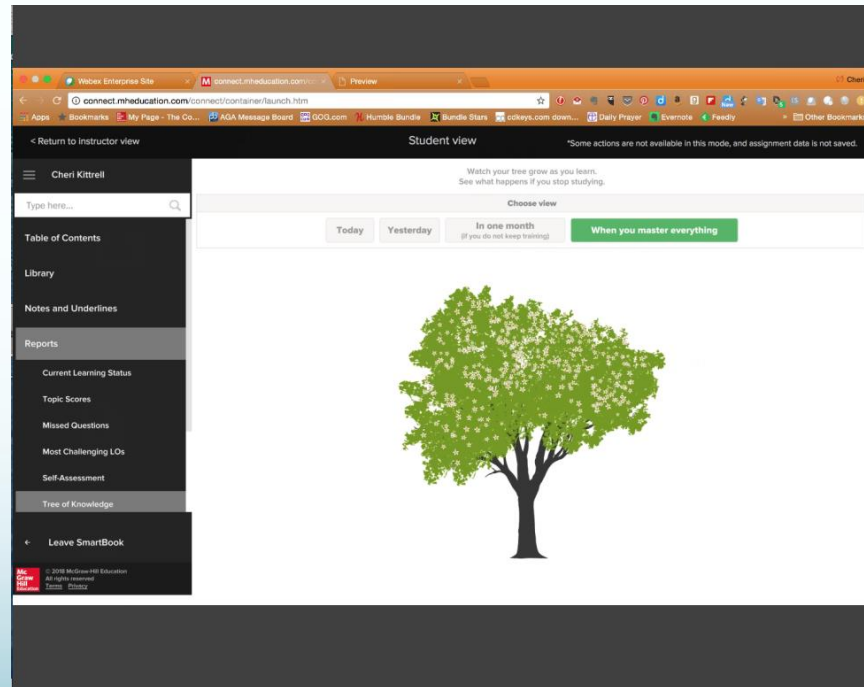
**metacognitive component**

**LearnSmart**

# Individualized Learning

- Students move through the assignment on own.
- If they miss a question then they will see it or something similar again.
- Based on completion so time will vary. (The less the students knows the more questions they will get and so it will take longer.)
- Requires 100% completion to get point (low points).
- Can “recharge”. After completing assignment student can go back and revisit, but will mostly see questions that they had difficulty with.

# Tree of Knowledge – completed – grows as students master material





# Metacognition – thinking about thinking

- Deborah Taylor
- Table of Contents
- Reports
- Current Learning Status
- Topic Scores
- Missed Questions
- Most Challenging LOs
- Self-Assessment
- Tree of Knowledge
- Settings
- Help
- ← Leave SmartBook

View how aware you were of whether or not you knew the answers to the questions you practiced. By being able to correctly identify what you know and what you don't know, you can focus your studies and prepare effectively.

## Aware that you knew the answer:

You were conscious of the fact that you knew the correct answer. If you have a high percentage in this category, you are well on your way to mastering the subject. You should still practice once in a while to keep your new knowledge fresh — you don't want to get rusty.

70%

## Aware that you didn't know the answer:

You knew that you didn't know the answer. That is OK! It takes time to learn new things. What is important is that you know which material you should study more. This is the first step towards improving. Just keep practicing and you will quickly learn this material!

2%

## Unaware that you knew the answer:

You thought you didn't know the answer, even though you actually did. When you are learning new material, it is easy to be uncertain about what you truly know and don't know. One way to gain confidence is to keep practicing. As you get more questions correct, you will start to trust in your new knowledge!

0%

## Unaware that you didn't know the answer:

You thought you knew the answer, but got the question wrong. If you have a high percentage in this category, be careful! You may think you know the material better than you really do. You don't want to do poorly on a test by not preparing well enough. Practice more to make certain you have learned the material.

28%

LearnSmart assignment

# set up assignment

## **LS** Chapter 1. The Study of Body Function

adjust depth of coverage for this assignment 

less content  more content

average time required:

**10 min**

Learning items covered: 13

Time spent reading or studying extra material is not included.

topics

include topic \*

1.1 Introduction to Physiology



1.2 Homeostasis and Feedback Control



1.3 The Primary Tissues

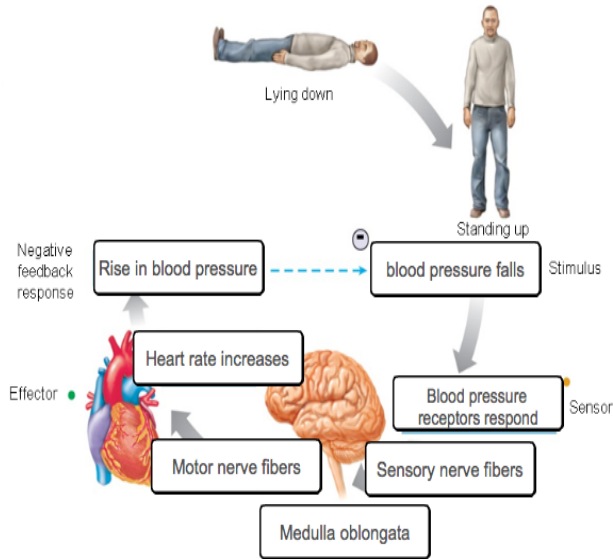


1.4 Organs and Systems



## Label the diagram showing homeostatic responses to blood pressure

Drag and drop the labels to the diagram showing the homeostatic response to blood pressure.



Reset Zoom Help

### Explanation:

When one goes from a lying to standing position blood pressure decreases. This is sensed by blood pressure receptors, baroreceptors, that initiate a response by sending information to the medulla oblongata via sensory neurons. The medulla oblongata analyzes the situation and send impulses via motor neurons to the heart to increase heart rate. The increased heart rate increases blood pressure. Review figure 1.6 in the text for more information.

### References

McGraw-Hill Connect

## Drag and Drop activity

# Lecture Capture

- Recorded the lectures (Echo 360 – other options are out there).
- Students could go back and review the content that they had trouble with.
- They also would have a chance to do the clicker questions again (but just on their own).
- Class recordings were made available to both my sections – online and onground.
- I received a great deal of positive feedback from the students stating that they really liked being able to go back and revisit the material.
- They could scroll through and just watch what they wanted.

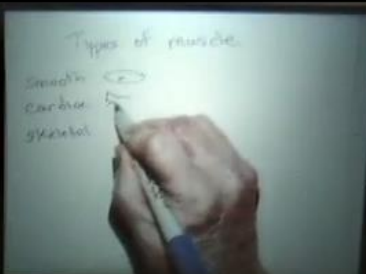
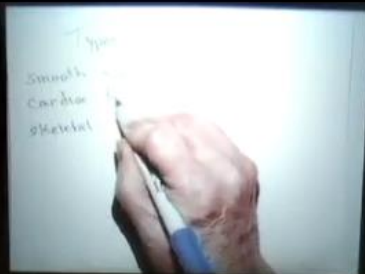
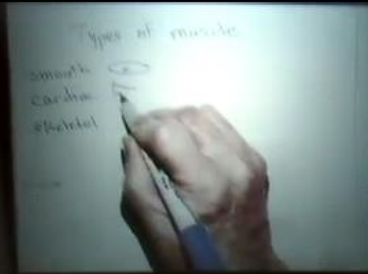
REORDER	Search Content	NEW GROUP	NEW CLASS				
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BIOL 246-SP 2018 Taylor	January 18, 2018 1:00pm-2:15pm				0		
BIOL 246-SP 2018 Taylor	January 23, 2018 1:00pm-2:15pm				0		
BIOL 246-SP 2018 Taylor	January 25, 2018 1:00pm-2:15pm				0		
BIOL 246-SP 2018 Taylor	January 30, 2018 1:00pm-2:15pm				0		
BIOL 246-SP 2018 Taylor	February 1, 2018 1:00pm-2:15pm				0		
BIOL 246-SP 2018 Taylor	February 6, 2018 1:00pm-2:15pm				0		
BIOL 246-SP 2018 Taylor	February 8, 2018 1:00pm-2:15pm				0		
BIOL 246-SP 2018 Taylor	February 13, 2018 1:00pm-2:15pm				0		
BIOL 246-SP 2018 Taylor	February 15, 2018 1:00pm-2:15pm				0		

# Let's visit a class

- <https://courseware.ku.edu>

# Drawing and Writing During Lecture

- Avoids “death by PowerPoint”
- Encourages engagement
- Watch video clip





# Drawing Live

- Two-dimensional matrix looking at various retrieval methods and what is gained with each.

# Notability for iPad

- Students can download the PowerPoints you post to your LMS and then can make notes and comments on the actual document.



# Brain Dump

- Right after covering a difficult unit give students 3-5 minutes to write everything that they remember on that topic.
  - No sentences needed
  - Spelling not important
  - Even drawings will help
- Then pair and share with your “group”
  - Do you have the same information?
  - What does this tell you about what you know?
- Sometimes I will do this at the very beginning of class.
- I also encourage students to do this in their study groups.

# Brain Dump Activity

- Get out a piece of paper and list as many of the retrieval practice tools as you can in one minute.
- Turn and share your results with your neighbor.
- Collect feedback.

# Feedback Poll

- [p.excitem.com/s/presentation/poll?eld=bf853d10031036564c8d8cc172a6cf65bd8b231878ed18369aef9d5cc2ffebfe](https://p.excitem.com/s/presentation/poll?eld=bf853d10031036564c8d8cc172a6cf65bd8b231878ed18369aef9d5cc2ffebfe)

# Retrieval Practice Resources

- <https://www.retrievalpractice.org/>
- <https://www.poojaagarwal.com/>
- <http://pdf.retrievalpractice.org/RetrievalPracticeGuide.pdf>
- <https://www.cultofpedagogy.com/retrieval-practice/>
- [https://www.edsurge.com/amp/news/2018-07-24-you-re-already-harnessing-the-science-of-learning-you-just-don-t-know-it?\\_twitter\\_impression=true](https://www.edsurge.com/amp/news/2018-07-24-you-re-already-harnessing-the-science-of-learning-you-just-don-t-know-it?_twitter_impression=true)

# References

Butler, A. C., & Roediger, H. L., III (2007). Testing improves long-term retention in a simulated classroom setting. *European Journal of Cognitive Psychology*, 19, 514-527.  
<http://dx.doi.org/10.1080/09541440701326097>.

Karpicke, J. D., & Blunt, J. R. (2011). Retrieval practice produces more learning than elaborative studying with concept mapping. *Science*, 331, 772-775. <http://dx.doi.org/10.1126/science.1199327>.

Any Questions?



Thanks for attending!

# PROPOSAL

- Engagement plays a critical role in student success, yet with so many distractions around in the online environment and in the lecture hall it is not always easy to keep students engaged. So, "How do you know if your students are engaged?" In this session I will share a few new and not-so-new methods to promote student engagement and enhance student learning. Some are old tools (clickers, think-pair-share) with a new twist (applying methods of retrieval-practice). I will also share an online resource for students in both online and on ground classes that provides individualized learning paths and reporting tools to help students use metacognition and goal setting to improve their learning. In all these methods students examine new material (lather), recall the information (rinse), and retrieve it in some manner (repeat).