Brain Training

- Mondays at 3:00pm, SW103
- Thursdays at 6:00pm, Zoom

- February 10 & 13; April 14 & 17: Tools of the Brain

- February 17 & 20; April 21 & 24: Effective Studying

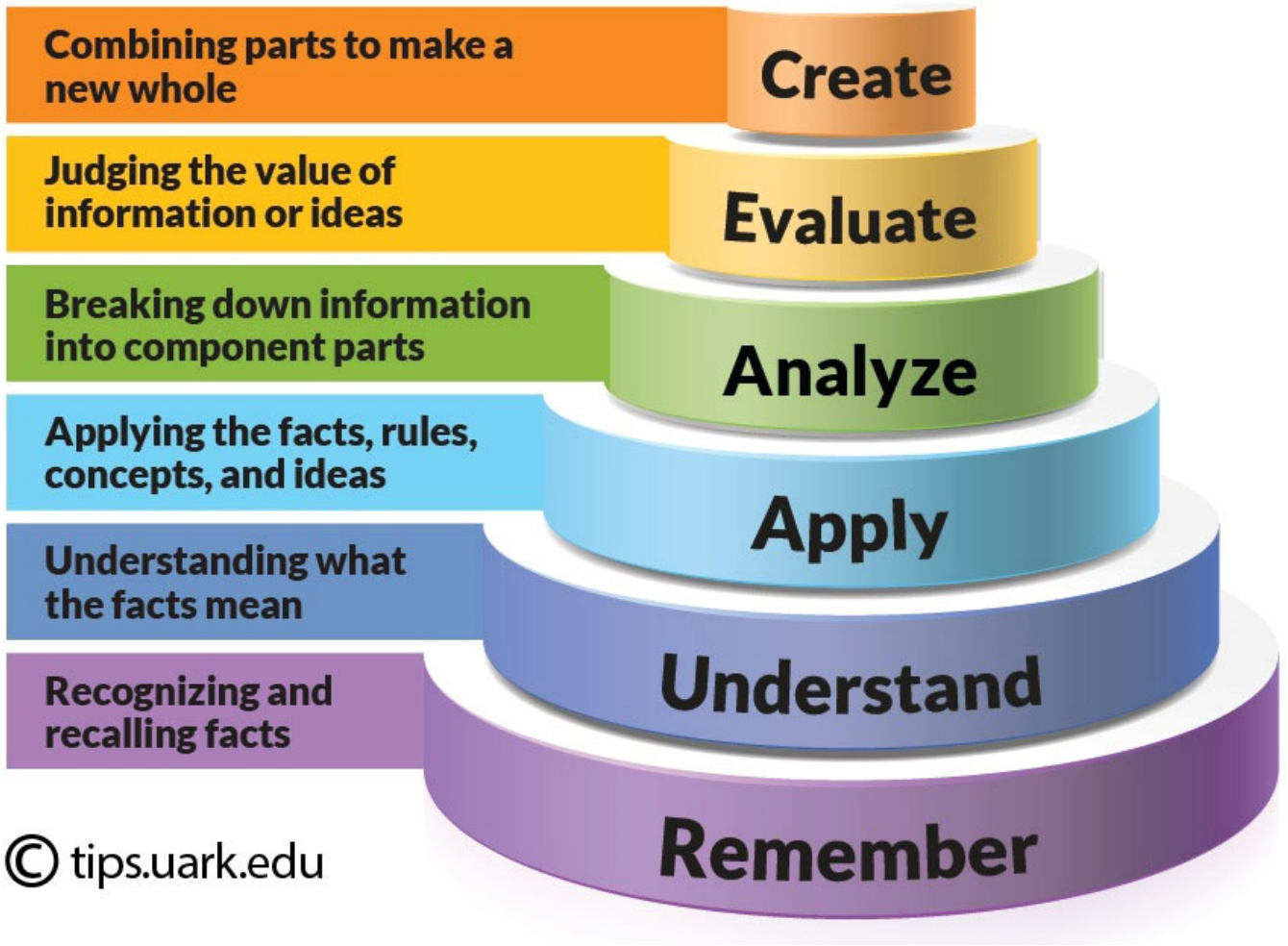
- February 24 & 27; April 28 & May 1: Beat Procrastination

- March 3 & 6; May 5 & 8: Conquer Exams

Effective Studying

Ways to study to make the most of your time

The Taxonomy of Understanding



The Dangers of Distraction

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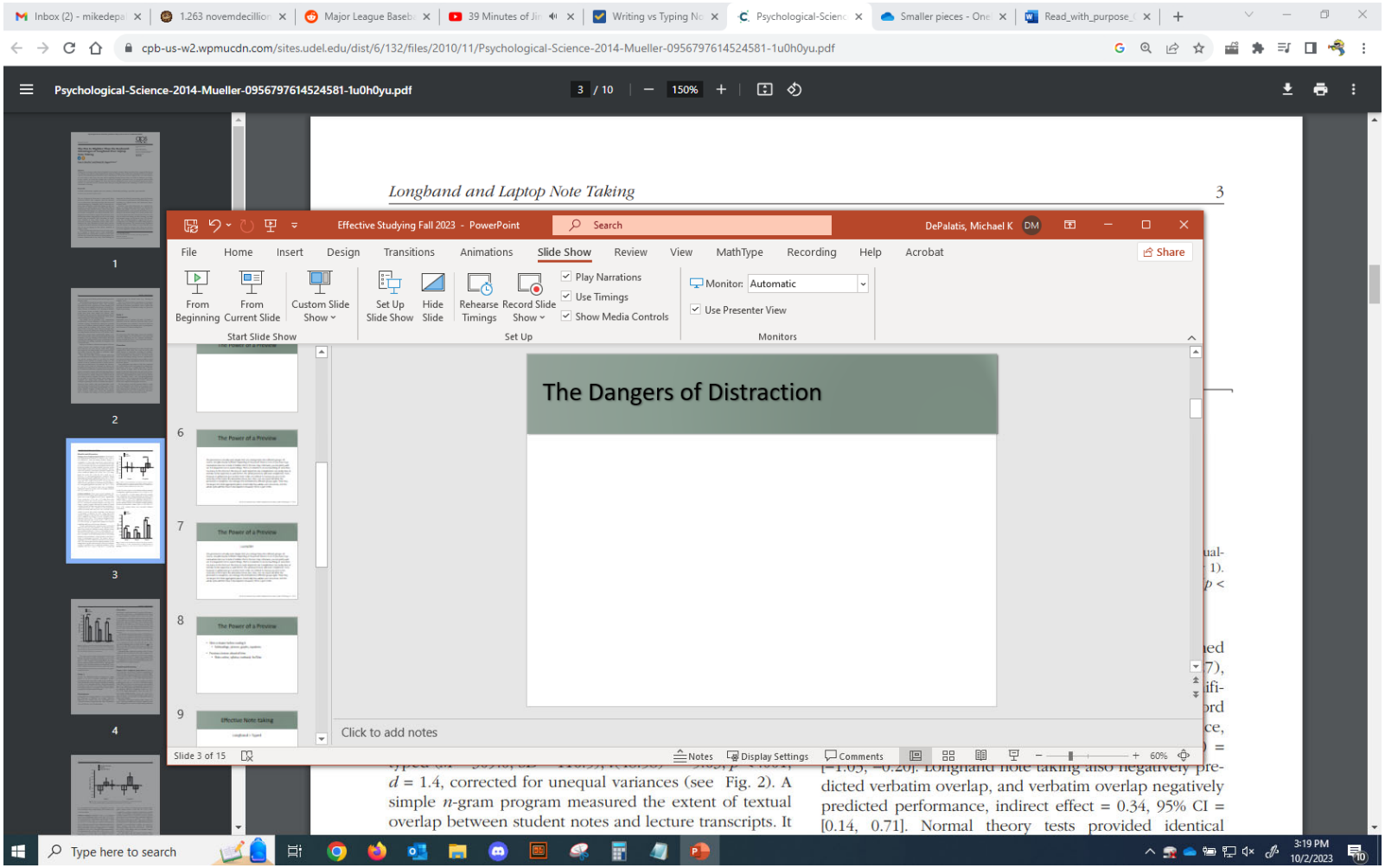

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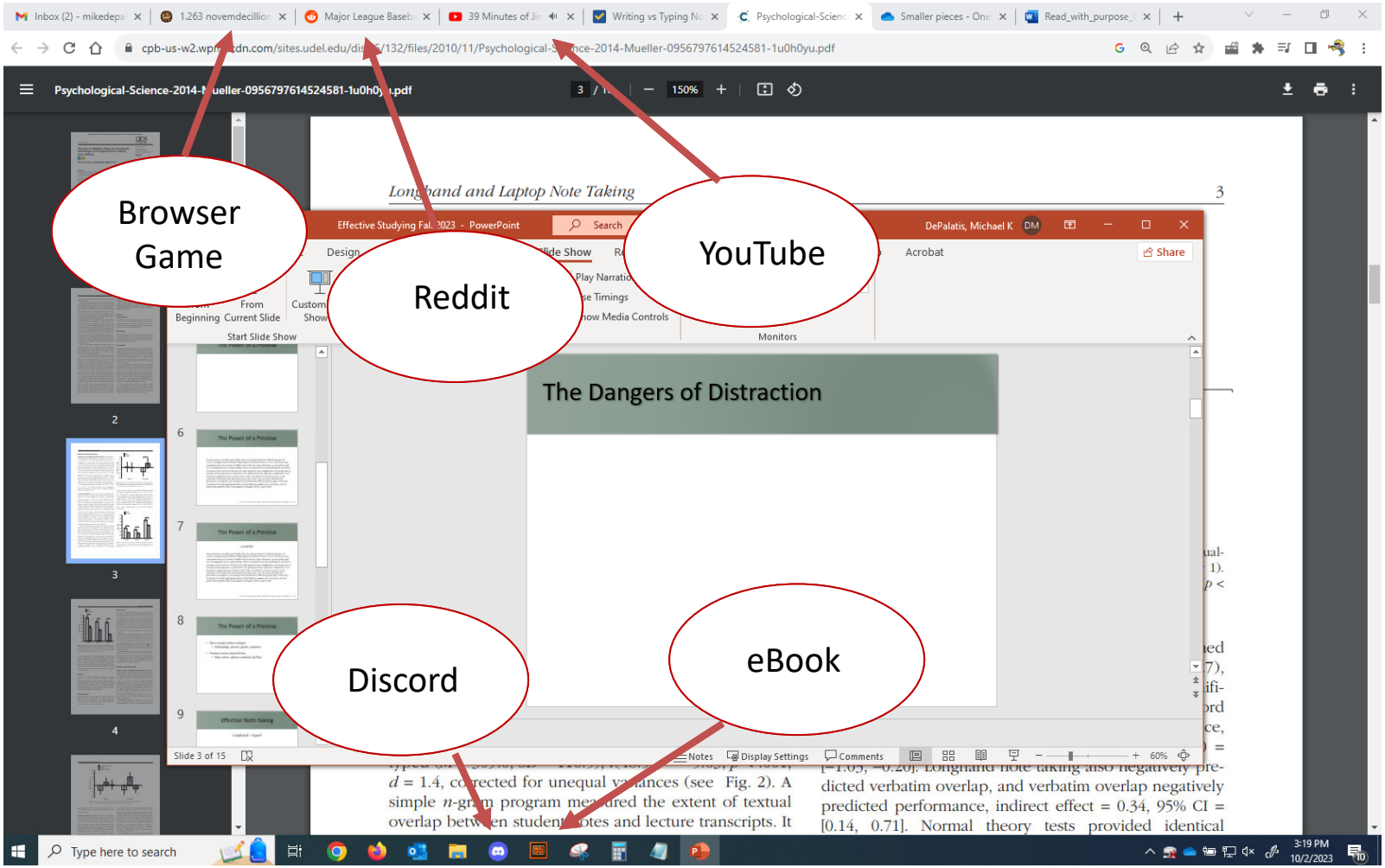

The Power of a Preview

The Power of a Preview

The procedure is actually quite simple. First you arrange items into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities that is the next step; otherwise, you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many. In the short run this may not seem important, but complications can easily arise. A mistake can be expensive as well. At first, the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity of this task in the immediate future, but, then, one can never tell. After the procedure is completed, one arranges the materials into different groups again. Then they can be put into their appropriate places. Eventually they will be used once more, and the whole cycle will then have to be repeated. However, that is a part of life.

McGuire, Saundra Yancy. *Teach Students How to Learn*, Stylus Publishing LLC., 2015

The Power of a Preview

“If you have to go somewhere else due to lack of facilities that is the next step”

Where do you go?

The Power of a Preview

LAUNDRY

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The Power of a Preview

“If you have to go somewhere else due to lack of facilities that is the next step”

Where do you go?

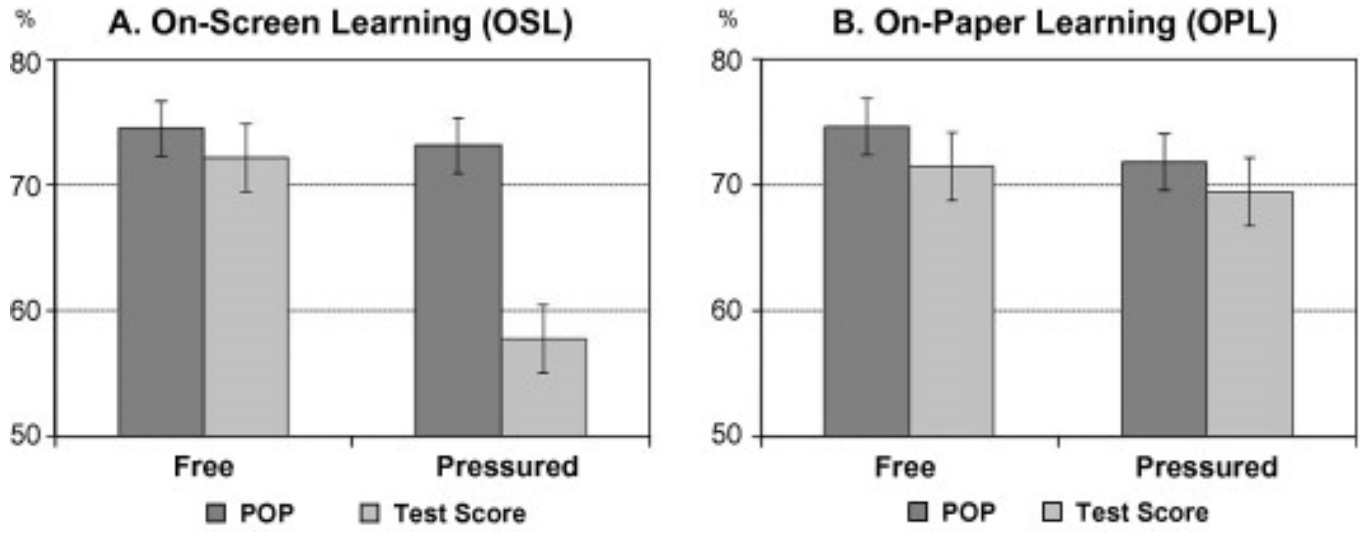
The Power of a Preview

- Skim a chapter before reading it
  - Subheadings, pictures, graphs, equations
  - Read the first sentence of each paragraph
  - Look at the little boxes and such

- Preview a lecture ahead of time
  - Slides online, syllabus, textbook, YouTube

Screen Inferiority

Reading on paper > reading on screens



Rakefet Ackerman & Tirza Lauterman. "Taking reading comprehension exams on screen or on paper? A metacognitive analysis of learning texts under time pressure." *Computers in Human Behavior*, volume 28, issue 5. September 2012.

Active Reading

Learning Outcomes

In this chapter, you'll learn...

1.1 What a physical theory is.

1.2 The four steps you can use to solve any physics problem.

1.3 Three fundamental quantities of physics and the units physicists use to measure them.

1.4 How to work with units in your calculations.

1.5 How to keep track of significant figures in your calculations.

1.6 How to make rough, order-of-magnitude estimates.

1.7 The difference between scalars and vectors, and how to add and subtract vectors graphically.

1.8 What the components of a vector are and how to use them in calculations.

Active Reading

(3.2)

Change in the particle's position vector

Average velocity vector of a particle during time interval from t_1 to t_2

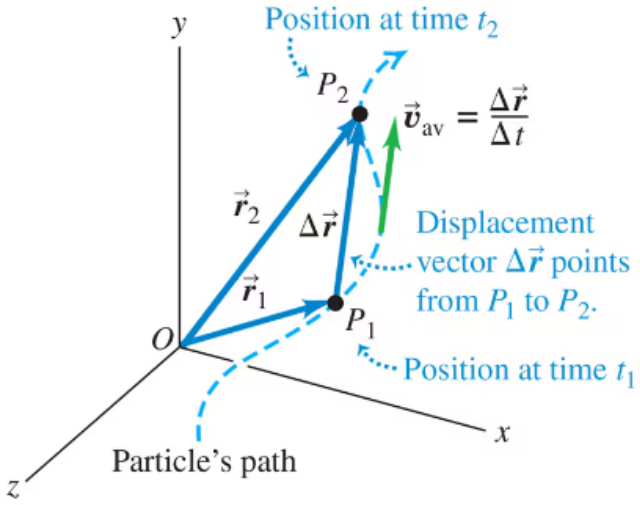
$$\vec{v}_{\text{av}} = \frac{\Delta\vec{r}}{\Delta t} = \frac{\vec{r}_2 - \vec{r}_1}{t_2 - t_1}$$

Final position minus initial position

Time interval

Final time minus initial time

Figure 3.2



Active Reading

Example 3.1 Calculating average and instantaneous velocity

A robotic vehicle, or rover, is exploring the surface of Mars. The stationary Mars lander is the origin of coordinates, and the surrounding Martian surface lies in the xy-plane. The rover, which we represent as a point, has x- and y-coordinates that vary with time:

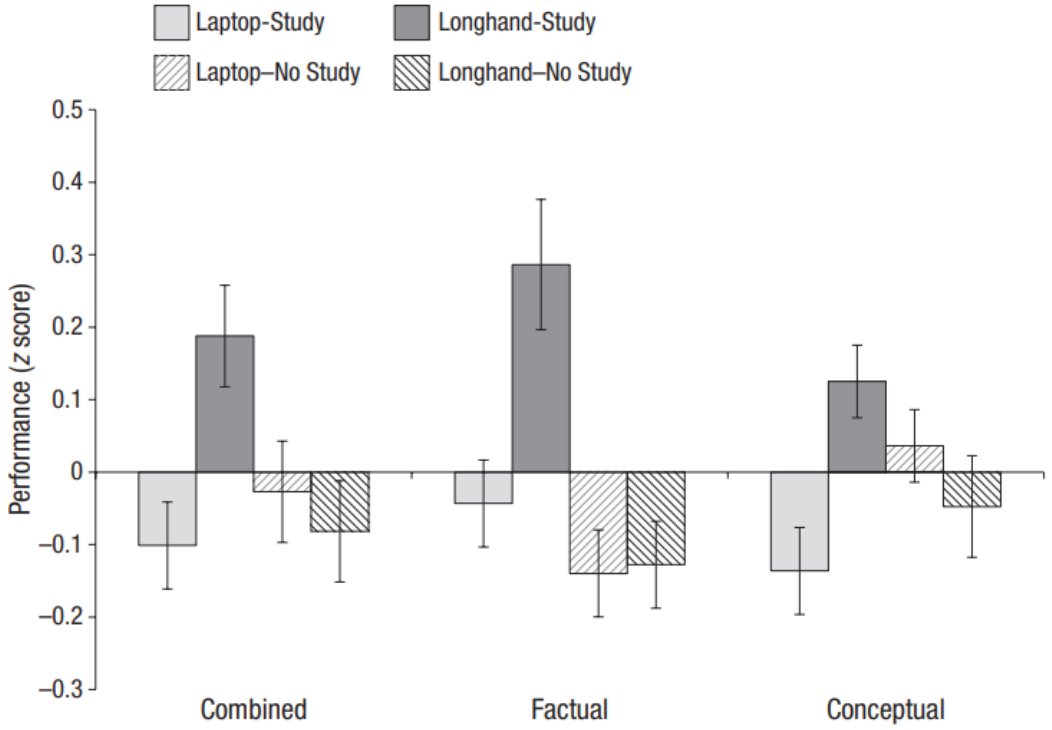
$$x = 2.0\ \text{m} - (0.25\ \text{m/s}^2)t^2$$
$$y = (1.0\ \text{m/s})t + (0.025\ \text{m/s}^3)t^3$$

(a) Find the rover's coordinates and distance from the lander at $t = 2.0$ s. (b) Find the rover's displacement and average velocity vectors for the interval $t = 0.0$ s to $t = 2.0$ s. (c) Find a general expression for the rover's instantaneous velocity vector $\vec{v}$. Express $\vec{v}$ at $t = 2.0$ s in component form and in terms of magnitude and direction.

IDENTIFY and SET UP This problem involves motion in two dimensions, so we must use the vector equations obtained in this section. Figure 3.5 shows the rover's path (dashed line). We'll use Eq. (3.1) for position $\vec{r}$, the expression $\Delta\vec{r} = \vec{r}_2 - \vec{r}_1$ for displacement, Eq. (3.2)

Effective Note-taking

Longhand > Typed



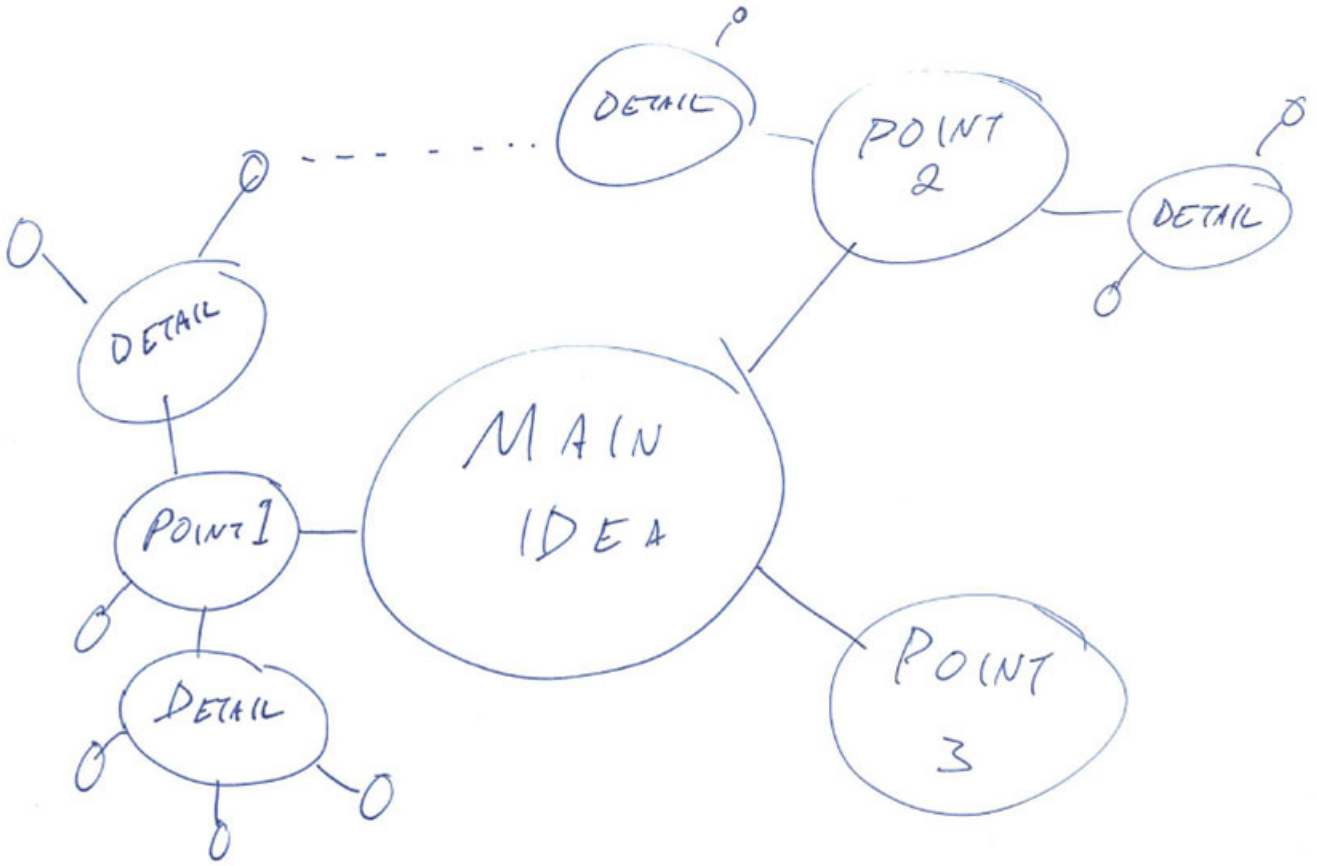
Mueller, Pam A. and Oppenheimer, Daniel M. "The Pen is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking." *Psychological Science*, 1-10. 2014.

Effective Note-taking

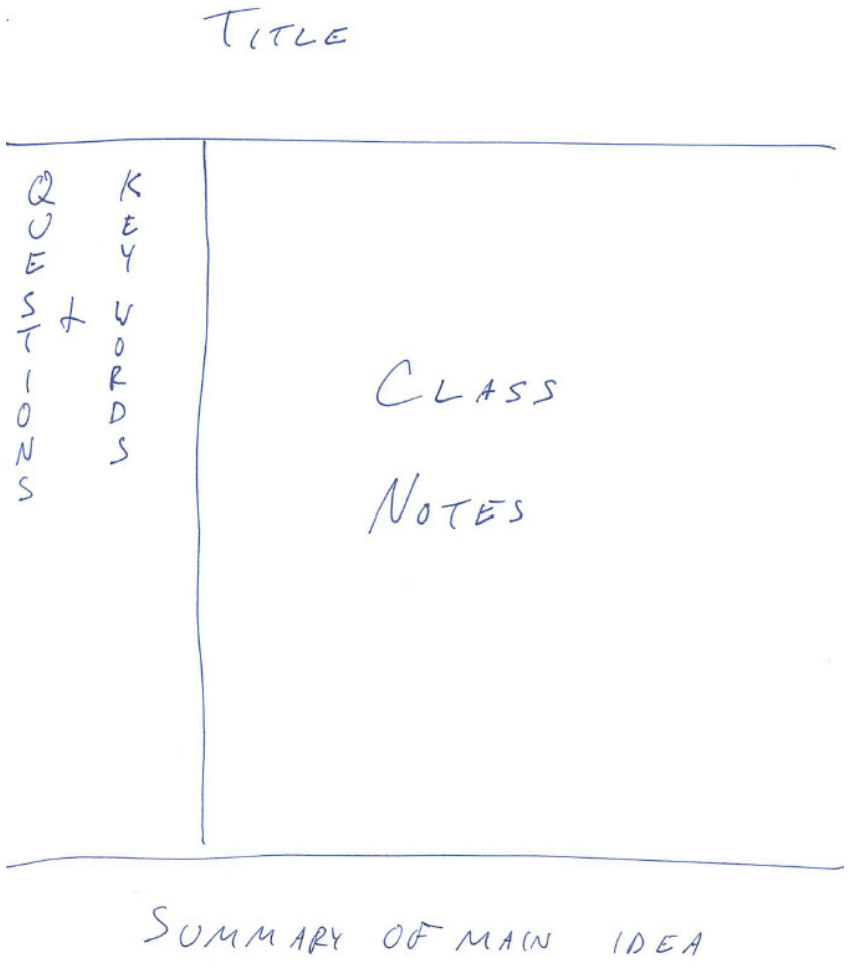
Outline Method

1. First main point
   - A. Sub-point
   - B. Another sub-point
     1. sub-sub-point
2. Second main point
   - A. Sub-point
3. Advantages
   - A. Familiar, easy to follow
   - B. Slides & handouts usually follow this structure
4. Disadvantages
   - A. Hard to link ideas together
   - B. Hard to structure properly if you don't initially understand

Effective Note-taking



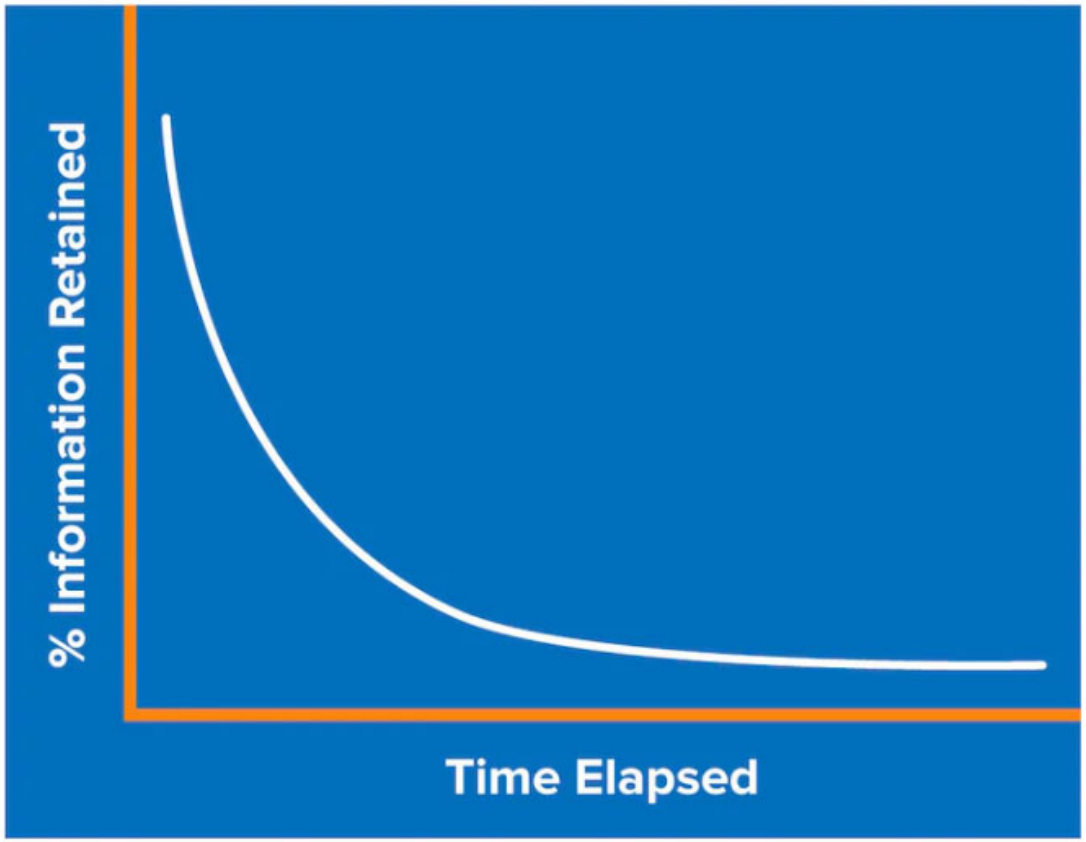
Effective Note-taking



Effective Note-taking

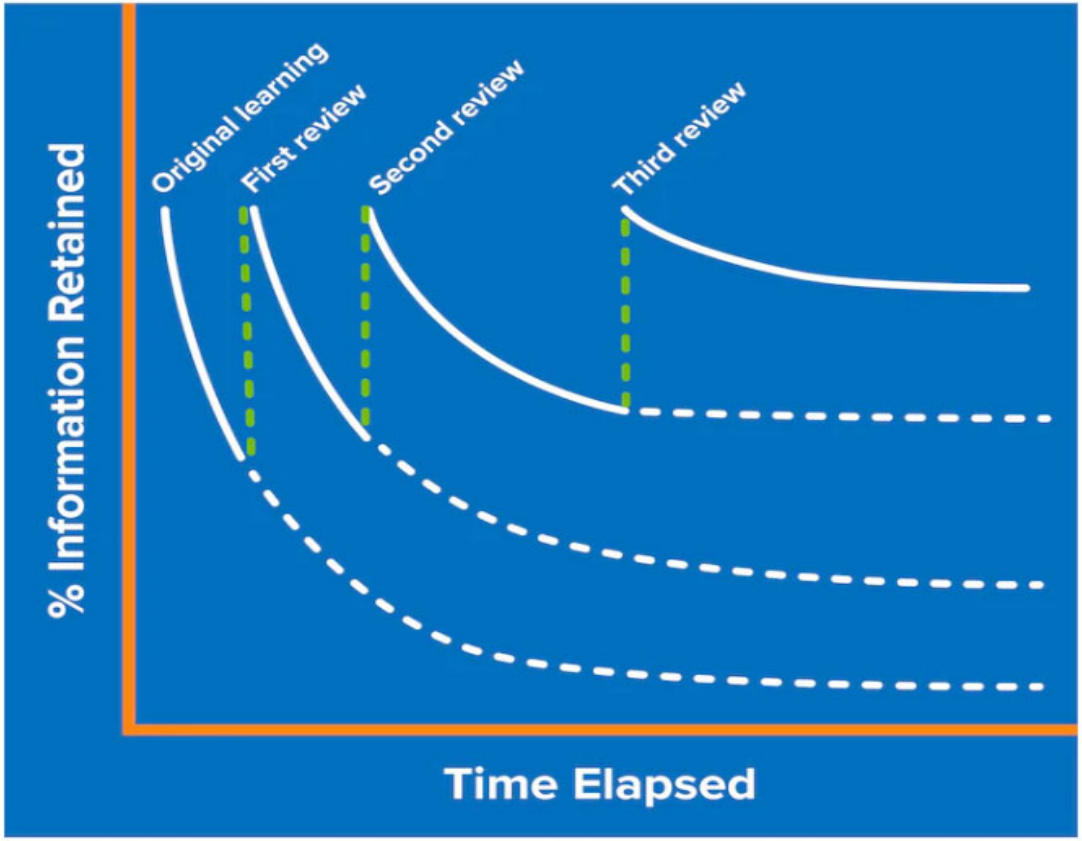
- Re-copy your notes!
    - It doesn't take that long – usually less than 15 minutes
    - Writing things out reinforces learning
    - Update your notes from the beginning of the lecture with your new understanding
    - Spot things you need to get clarification on
    - Clean and organize your notes for later review
    - Do it as soon as possible – while the information is fresh
        - Get stuff down while it's still in short-term memory

The Value of Spaced Repetition



https://www.mindtools.com/a9wjrjw/ebbinghauss-forgetting-curve

The Value of Spaced Repetition



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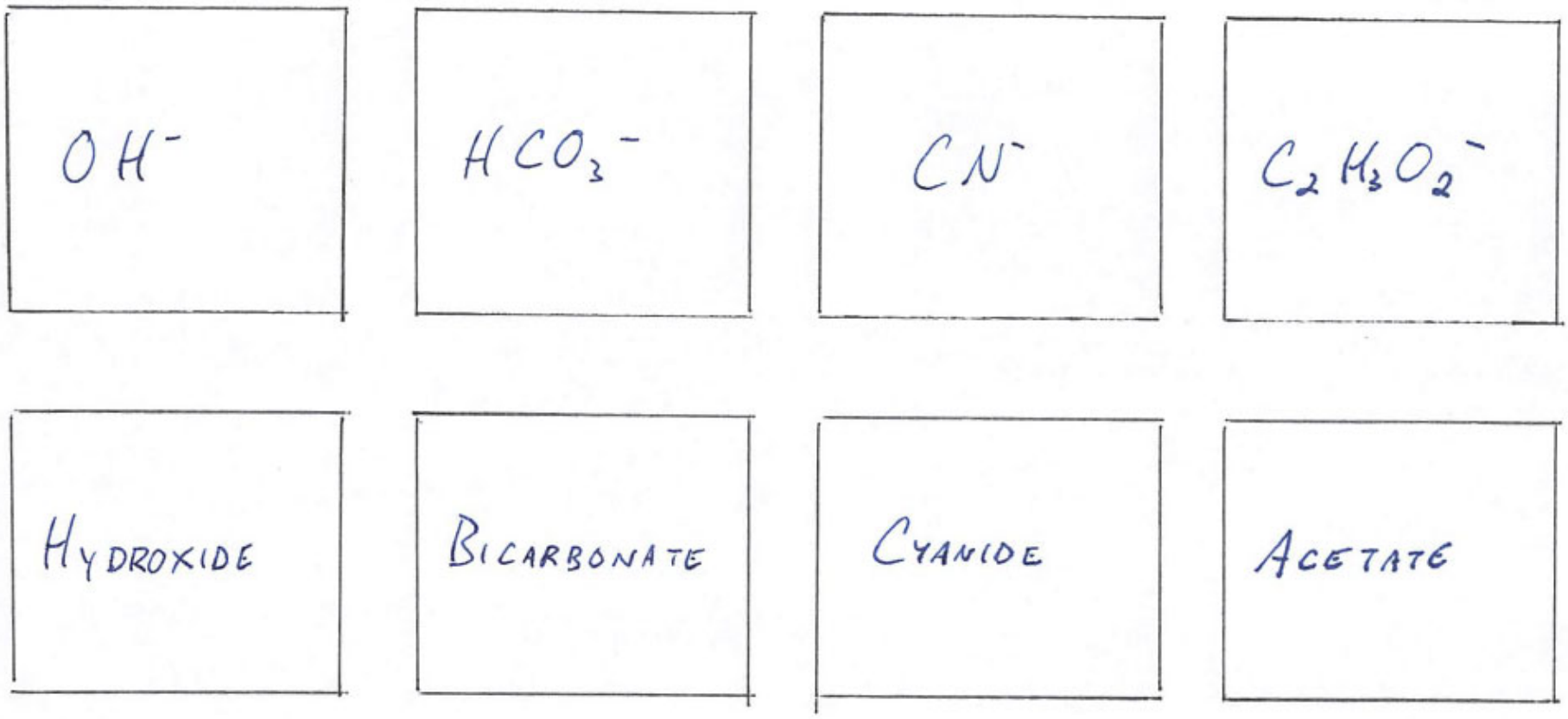
Flash Cards

- Writing by hand reinforces learning
- Mix up the *order*
- Mix up the *direction*
- Know/don't know piles
  - Sort into "know" and "don't know" piles
  - Commit ***2*** of the "don't know" to memory, and add them to the "know" pile
  - Shuffle and review the "know" pile to reinforce

Flash Cards



Flash Cards

Hydroxide	CN^-	Acetate	HCO_3^-
OH^-	Cyanide	$C_2H_3O_2^-$	Bicarbonate

Flash Cards

- Writing by hand reinforces learning
- Mix up the *order*
- Mix up the *direction*
- Know/Don't Know piles to get them in your long-term memory
- Used spaced repetition
  - A few minutes frequently > doing it a lot at once
- Carry them with you

Study Guides

- Create & maintain *as you go along*
  - Fill it in when it's fresh and makes sense
- Page for each topic/chapter
- Fill in with the important things
  - Not sure if it's important? Ask!
- ***Copy in practice problems!***
- The creation of the study guide is automatically studying

Take home tips

- Preview your lectures
- Write notes by hand
- Take good notes
  - ASK QUESTIONS!
- Recopy your notes the same day
- Review your notes using spaced repetition
- Memorize what you are told to memorize
- Test yourself
  - Have a study strategy