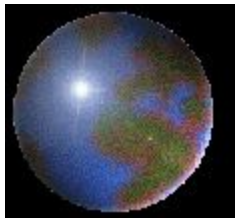


Metacognition: The Key to Acing Courses!

Saundra Y. McGuire, Ph.D.
Assistant Vice Chancellor
Professor, Department of Chemistry
Past Director, Center for Academic Success
Louisiana State University

Resources from Teach Students How to Learn, by Saundra McGuire
Used with Permission:https://styluspub.presswarehouse.com/Titles/TeachStudentsHowtoLearn.aspx

LOUISIANA STATE UNIVERSITY

Center for Academic Success

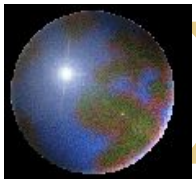
UNIVERSITY COLLEGE

NCLCA

National College Learning Center Association

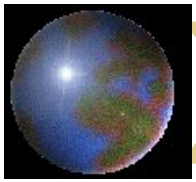
2004 National College Learning Center Association
Frank L. Christ Outstanding Learning Center Award

Presidential Recognition
White House Oval Office
November 16, 2007



The Story of Three Students

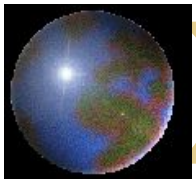
- Travis, junior psychology student
  47, 52, 82, 86 B in course
- Joshua, first year chemistry student
  68, 50, 50, 87, 87, 97, 90 (final) A in course
- Dana, first year physics student
  80, 54, 91, 97, 90 (final) A in course



How'd They Do It?

They became expert learners
by using ***metacognition***!

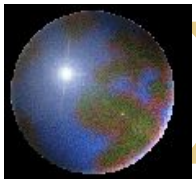
They studied to LEARN,
not just to make the grade!



Reflection Questions

- What's the difference, if any, between *studying* and *learning*?

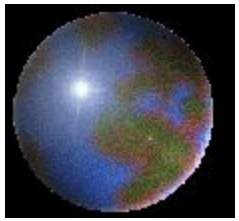
- For which task would you work harder:
  A. Make an A on the test
  B. Teach the material to the class?



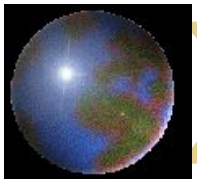
To Ace STEM Courses
(and everything else!)

- Stay in *learn* mode, not *study* mode

- Study as if you have to *teach* the material, not just make an A on the test



Use Metacognition to Become an Expert Learner

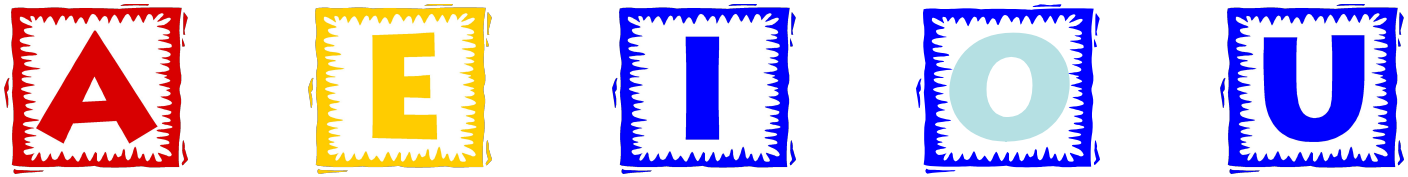


Metacognition

The ability to:

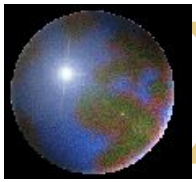
- **think about thinking**
- **be consciously aware of oneself as a problem solver**
- **to monitor and control one's mental processing**
- **to be aware of the type of learning that you are doing**

Counting Vowels in 45 seconds

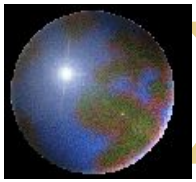


How accurate are you?

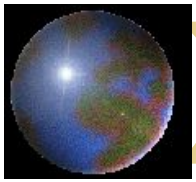
Count all the vowels in the words on the next slide.



Dollar Bill	Cat Lives
Dice	Bowling Pins
Tricycle	Football Team
Four-leaf Clover	Dozen Eggs
Hand	Unlucky Friday
Six-Pack	Valentine’s Day
Seven-Up	
Octopus	Quarter Hour



How many words or phrases do you remember?



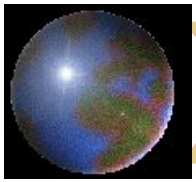
Let's look at the words again…

What are they arranged according to?

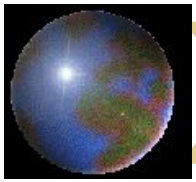
Dollar Bill
Dice
Tricycle
Four-leaf Clover
Hand
Six-Pack
Seven-Up
Octopus

Cat Lives
Bowling Pins
Football Team
Dozen Eggs
Unlucky Friday
Valentine's Day
Quarter Hour

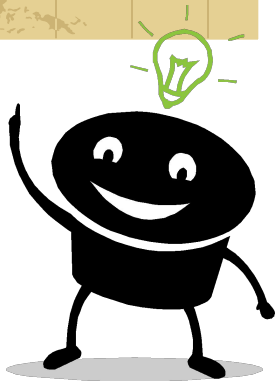
What are the words arranged according to?



NOW, how many words or phrases do you remember?

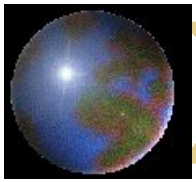


What were two major differences between the 1st and 2nd attempts?



1. *We knew what the task was*

2. *We knew how the information was organized*

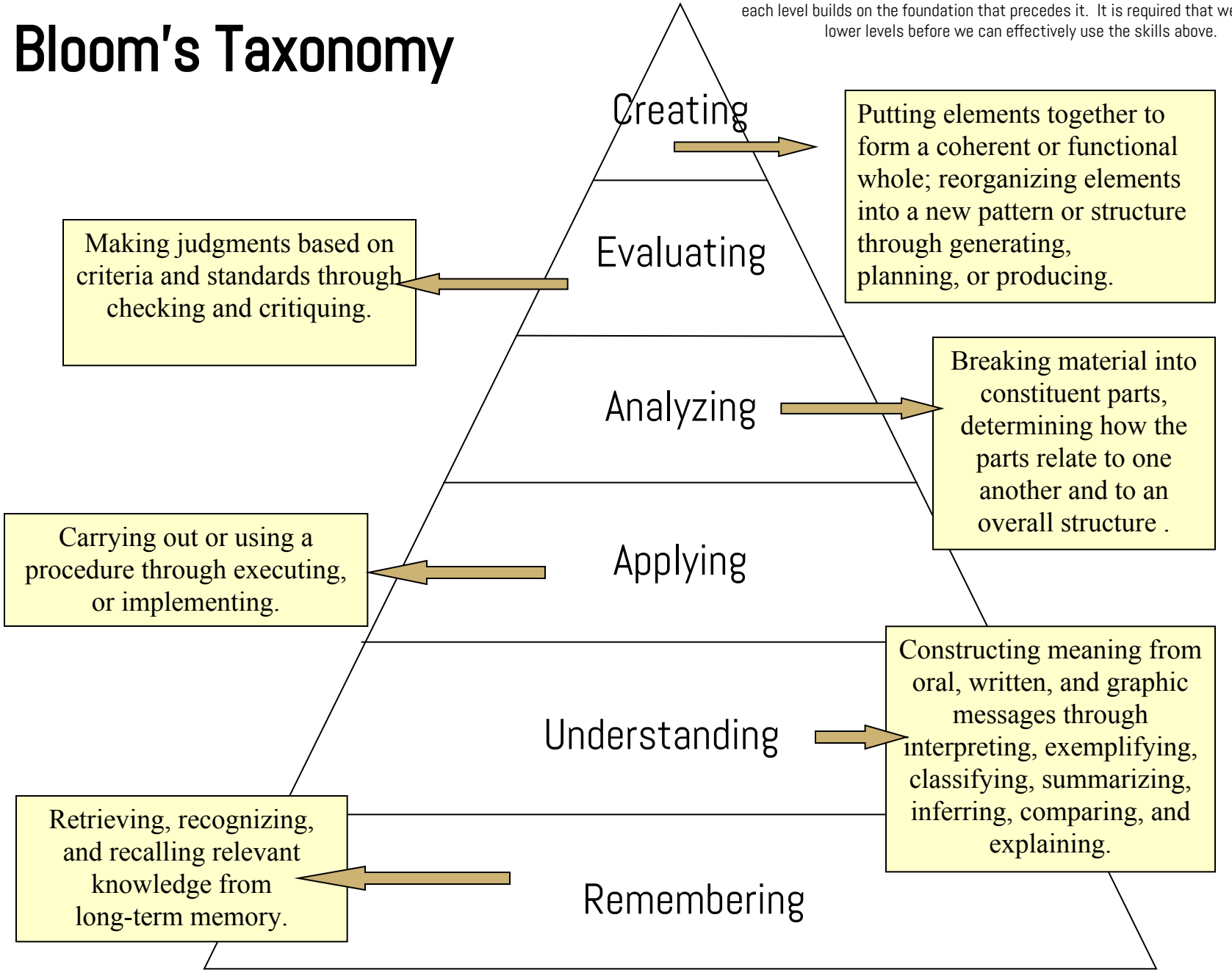


Turning Yourself into an Efficient, Expert Learner

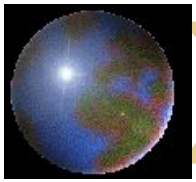
- Do "think aloud" exercises
- Constantly ask yourself "why" and "what if" questions
- Always test your understanding by verbalizing or writing about concepts; practice retrieval of information
- Move your activities higher on the *Bloom's taxonomy* scale by comparing and contrasting, thinking of analogies, thinking of new pathways, etc.

Bloom's Taxonomy

This pyramid depicts the different levels of thinking we use when learning. Notice how each level builds on the foundation that precedes it. It is required that we learn the lower levels before we can effectively use the skills above.

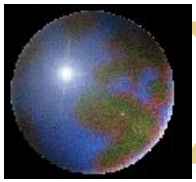


http://www.odu.edu/educ/llschult/blooms_taxonomy.htm▪



At what level of Bloom's did you have to operate to make A's or B's in high school?

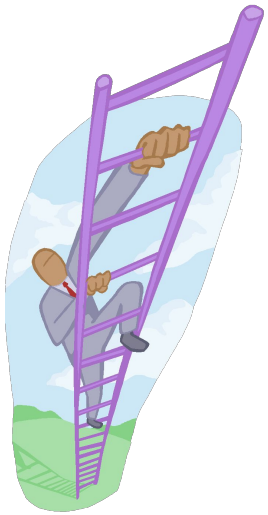
1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating



At what level of Bloom's do you have to operate to make A's in college?

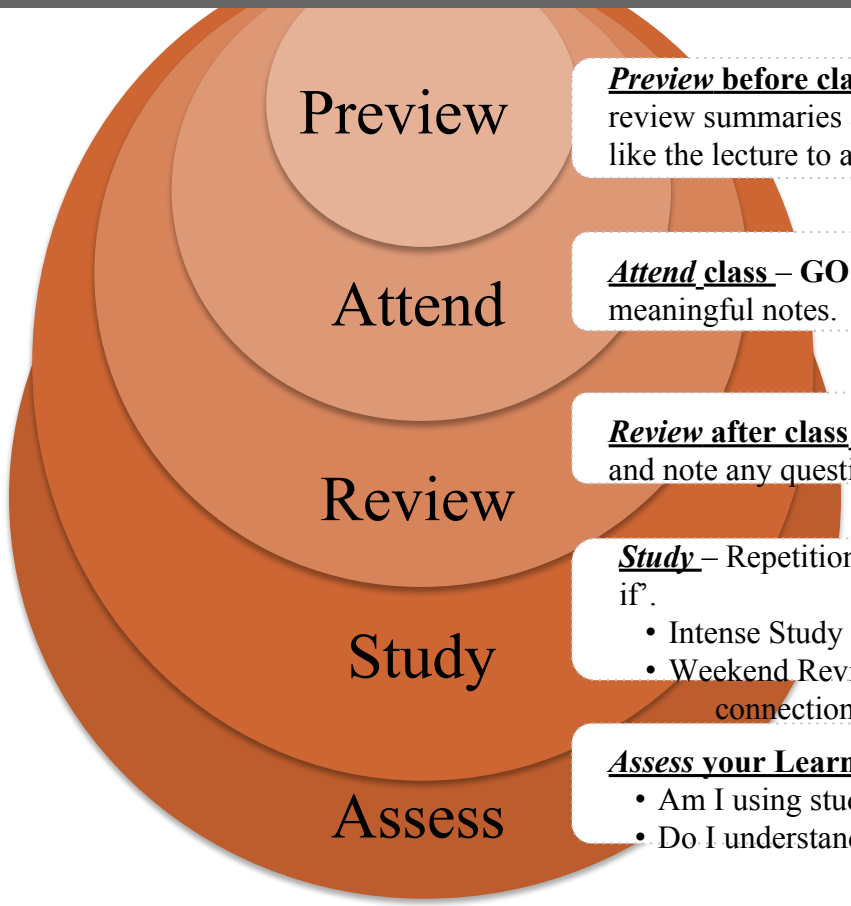
1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating

*How do you move yourself **higher** on Bloom's Taxonomy?*



*Use the **Study Cycle** with **Intense Study Sessions!***

The Study Cycle



***Preview* before class** – Skim the chapter, note headings and boldface words, review summaries and chapter objectives, and come up with questions you'd like the lecture to answer for you.

***Attend* class – GO TO CLASS!** Answer and ask questions and take meaningful notes.

***Review* after class** – As soon after class as possible, read notes, fill in gaps and note any questions.

Study – Repetition is the key. Ask questions such as 'why', 'how', and 'what if'.

- Intense Study Sessions* - 3-5 short study sessions per day
- Weekend Review – Read notes and material from the week to make connections

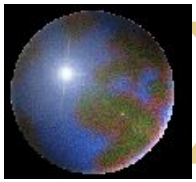
***Assess* your Learning** – Periodically perform reality checks

- Am I using study methods that are effective?
- Do I understand the material enough to teach it to others?

*Intense Study Sessions

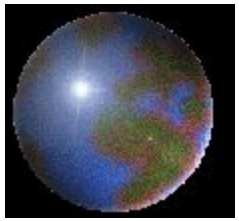
1	**Set a Goal**	(1-2 min)	**Decide what you want to accomplish in your study session**
2	**Study with Focus**	(30-50 min)	**Interact with material**- organize, concept map, summarize, process, re-read, fill-in notes, reflect, etc.
3	**Reward Yourself**	(10-15 min)	**Take a break**– call a friend, play a short game, get a snack
4	**Review**	(5 min)	**Go over what you just studied**

LSU
Center for Academic Success
B-31 Coates Hall ▪ 225.578.2872 ▪www.cas.lsu.edu

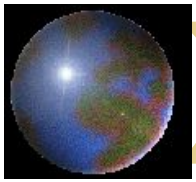


Effective Metacognitive Strategies

- **Always solve problems without looking at an example or the solution**
- **Memorize everything you're told to memorize**
- **Always ask why, how, and what if questions**
- **Test understanding by giving "mini lectures" on concepts**
- **Spend time on each course every day**
- **Use the Study Cycle with Intense Study Sessions**
- **Visit the Learning Commons on a regular basis**
- **Aim for 100% mastery, not 90%!**

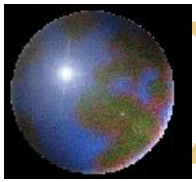


Which One of the Next Two Slides More Accurately Describes YOUR Actions to Date in Your Courses?



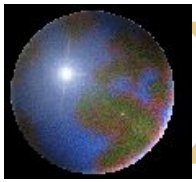
Top 5 Reasons Folks Did Not Do Well on Test 1 in General Chemistry

1. Didn’t spend enough time on the material
2. Started the homework too late
3. Didn’t memorize the information I needed to
4. Did not use the book
5. Assumed I understood information that I had read and re-read, but had not applied



Top 5 Reasons Folks Made an A on Test 1:

1. Did preview-review for every class
2. Did a little of the homework at a time
3. Used the book and did the suggested problems
4. Made flashcards of the information to be memorized
5. Practiced explaining the information to others



Email from an Engineering Professor at New Mexico State Received on 10/22/2013

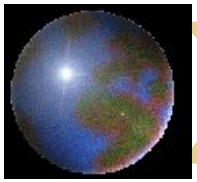
…At the end of the presentation, they were given a survey to determine their self-assessment of their use of the strategies, and were divided into groups

Group 1: students who did not use the strategies
Group 2: students who used the strategies

The results are shown below:

Use of Strategies	Av. on Exams 1 and 2
Students who did not use the strategies	58 and 54
Students who used the metacognitive learning strategies	95 and 80

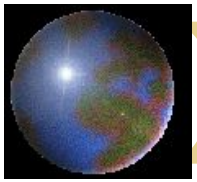
Using the strategies makes the difference!



*Comments from Engineering Students about what they changed for Test 3**

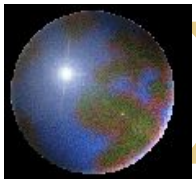
- I changed my study habits by **doing the homework early**. I also **started reading some of the material before going to the class.** The most effective was **spending more time** on the material.
- I **started studying for the exam sooner**. I also took more time to do the homework. I **reviewed/rewrote my notes from class**.
- **I studied for the class as close to everyday** as possible
- **I got together with other classmates** and helped them with their weakness and of course they helped me with mine as well.

class average increased from 65.7% to 80.5%!



So, What Can You Do, Starting Now, to Pursue Your 4.0 this semester?

- Spend more time studying
  (at least 2 hours/week for every hour in class)
- Aim for higher learning levels and 100% understanding
- Use office hours and study groups productively
- Use the Study Cycle
  with Intense Study Sessions
- Use Metacognition to Study Smarter!!!



Writing Exercise

What strategy will *you* commit to implementing?

If you don't start it within the next 48 hours...

... you probably never will.