Incorporating Study Strategies in Your Class for Improved Student Success

Michael Sehorn
Clemson Students

2023 First-Year Profile

- **57%** Top 10 Percent of Class
- **86%** Top 20 Percent of Class
- **99%** Top 50 Percent of Class

- **60,122** Applied
- **22,879** Accepted
- **4,494** Enrolled

**SAT:** 1240-1400
**Middle 50% of SAT Scores**

**ACT:** 28-32
**Middle 50% of ACT Scores**
Most Clemson students did not have to study hard in high school to get good grades.

There are exceptions eg. Governor’s School
The high school study strategy

• They used study guides provided by teachers.

• They don’t know how to take notes.

• They start the study process too late.

Yet, they still get good grades.
The high school study strategy at Clemson

• Many students are surprised by their first test score.

• Like any good Clemson student, they adapt.

• Still get a good grade.
Transfer students and especially first-generation students struggle.
Biochemistry students

- Type A ++
- They are hyper-focused on their GPA.
- They have numerous extracurricular activities.
- They struggle when they are not perfect.
- They can be toxic.
Biochemistry students

• 15-20% want to attend graduate school.

• ~90% of the students will attend graduate school.
Biochemistry students

• 50-60% want to go to medical school.

• ~85 of the students will go to medical school.
BCHM 4360: Genes to Proteins

• Designed to prepare students for medical school and graduate school.

• The bonus is they learn biochemistry and molecular biology which helps for the MCAT.
Preconceived notions

- Dr. Sehorn is scary.
Preconceived notions

• Dr. Sehorn is scary.
• Dr. Sehorn is mean.
Preconceived notions

• Dr. Sehorn is scary.
• Dr. Sehorn is mean.
• Dr. Sehorn is never available to meet.
Preconceived notions

• Dr. Sehorn is scary.
• Dr. Sehorn is mean.
• Dr. Sehorn is never available to meet.
• Dr. Sehorn’s class is hard.
Preconceived notions

- Dr. Sehorn is scary.
- Dr. Sehorn is mean.
- Dr. Sehorn is never available to meet.
- Dr. Sehorn’s class is hard.
- Dr. Sehorn’s class is a lot of work.
Experience

Teaching & Research in . . .

• Biochemistry
• Analytical Instrumentation
• Biotechnology
• Biophysics
• Molecular Biology
Homologous Recombination and DNA Double Strand Break Repair

- Unrepaired DSBs are catastrophic
  - Aneuploidies
  - Cancer
  - Cell death

- Cells have DNA DSB repair pathways
  - Non-homologous End Joining
  - Homologous recombination

- Homologous recombination is error-free pathway
Human Dmc1 nucleoprotein filament
Students are informed on what is to come

Exam Format

• ~20 True-False questions
• ~15 Multiple Choice, Multiple-Multiple Choice questions
• Boat load of Free Response (short answer and essay)
  • The student will be responsible for understanding and being able to discuss and answer questions based on multiple research articles.
  • The student should make sure they devote substantial time studying the research articles to do well on exams.
  • Moderate to difficult
  • Based on multiple levels of understanding.

Hint: 3 - 5 days before an exam is not adequate to read, understand and hardwire the information in the research articles.
I can assure you this course will challenge you.
How do you improve your chances of doing well?
Come to Class

• Higher attendance means higher grades.

• PowerPoints have most, but not all material.

• Some “have-to-know” hints given.

• Attendance will be randomly taken.
Make “Good” Notes

• “Good note-takers” score 45% points better than “bad note-takers”.

• “Taking Notes” ≠ “Making Notes”.

• Powerpoints can give false sense of security.
  • Is note-taking really necessary?
  • Organization may not be appropriate for your style of studying & learning.
  • Do not promote “higher level” synthesis & learning.

• Take notes w/o powerpoints, then integrate?
Before class?
Right after class – often the best.
Information is still “fresh”.
Can (& should) fill in additional comments not in PowerPoint's.
Study Adequately & Regularly

“I studied for 36 hours straight but still did poorly on the exam”.

• 3 Hours (minimum) for each hour of class time.
• Return to earlier materials often.
• Synthesize, integrate & relate.
Comprehension Quizzes

• Please do the daily quiz all by yourself as it is a low stakes assignment designed to provide you feedback on how you are doing with your studying.

• The goal is to let Dr. Sehorn not only know what material was understood, but more importantly, the material that was confusing.

• This will guide Dr. Sehorn to help clarify any confusion. Ultimately, the goal is to improve the performance on the exams.
New for this semester!

Try not to be too excited…..
New for this semester!

Each person will remake Chapter 4 and Chapter 6 powerpoint slide shows to make them functional. Creativity is encouraged, such as drawing using an iPad etc.
- CMG helicase at the replication fork disrupts nucleosomes in its path
- Histone chaperone proteins then re-assemble histones on the new daughter strands
- The histone chaperone FACT, along with ASF protein, helps to disrupt the nucleosome ahead of the fork and transfer the old H3/H4 from before of the fork to behind the fork
- FACT is also involved in deposition of new nucleosomes behind the fork
- New H2A and H2B histones are loaded to make a half nucleosome, and new H3/H4 histones are assembled together by CAF1 protein (see next figure)
- FACT then interacts with the new H3/H4 histones and CMG helicase and deposits them with the H2A/H2B half nucleosome to make a complete new nucleosome
Replicating through Chromatin
- Origin unwinding in eukaryotes is very different to bacteria
- The ORC recruits CdC6 and Cdt1 proteins
- These sequentially load two ring-shaped MCM2-7 hexamers in a head-to-head orientation
- The ORC dissociates once the MCM2-7 pair is loaded
- The MCM2-7 pair is then activated by accessory proteins such as Cdc45
- Other proteins are loaded, including polymerase, and then the full helicase complex (called CMG) can be activated by phosphorylation to unwind DNA and start replication
Initiation in Eukaryotes

ORC recruits CdC6 and Cdt1

These proteins load, head-to-head, two ring-shaped MCM2-7 hexamers, causing ORC to dissociate

Accessory proteins (like Cdc45) then activate the MCM2-7 pair

Polymerase and other proteins are loaded, forming the complete helicase complex known as CMG

This can then be activated by phosphorylation, unwinding the DNA and initiating replication
Powerpoint Slides 2.0

• Each student uploads their own individual Chapter revised/modified powerpoints to Canvas the night before class.

• During class students will form groups of 3-4 people.

• The group will review each group member’s modified/revised powerpoint show and create a single group powerpoint slide show that incorporates the best parts of each individual group member’s powerpoint slideshow covering all the material in the Chapter.

• The group will select one person to upload the collaborative powerpoint to Canvas with each group members name attached to it.
What do I get for this extra effort?

Besides a better understanding of the material that will undoubtedly result in a high score on your exam?
Bonus points!

- Each person that uploads an individual powerpoint that they revised/modified/created to Canvas, will get 3 bonus points added to their Exam 1 score.

- Each member of the group that uploads the collaborative powerpoint slide show to Canvas will get 2 points added to their Exam 1 score.
Reflection for Exam 1

• What they thought about the extra work.
• Do they think it helped them?
• Would they do it for exam two?
• What would they do differently?

After they were done with the reflection, I revealed that their scores on Exam 1 were 17 points higher than every previous class without the 5 points of bonus added.

I told them I was impressed and they should be proud of the effort they put in.
The average on the final exam was 15 points higher than any previous year.

The average number of points students earned on the 60 free response question that covered all the information through the semester was 57.
Skip ahead to the final exam

• The number of students earning an A increased from 35% to 50%.

*I let my Chair know that there was a possibility my class would have more As than usual.*

• Students that took the MCAT after the class reported significant increases in their score for the biochemistry section.
Next time

• I won’t restrict it to just a revised powerpoint.