

# CHANGING HOW WE TEACH BIOCHEMISTRY: FROM LECTURES TO INTERACTIVE GROUPS

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## Background

A drop of attendance for lectures is a common problem for medical schools. The adult learner is very different today compared to the student from 10 years ago, when learning was primarily from lectures and reading textbooks. Today, there are many resources available that are streamlined and efficient. However, they present the material as isolated facts and don't integrate the concepts which are essential for long-term learning. The goal of this project is to develop new interactive teaching methods to replace the biochemistry lectures currently taught in the pre-clerkship curriculum at CWRU.

## Curriculum Innovation

-Developed short ~5 min videos

-Developed formative quizzes that review the biochemistry content in the videos.

-Replace standard lectures with asynchronous learning using the developed resources. (Time on Mon and Tues to do the pre-work).

-Friday was a required in person active session that applied the learning from the week. (Patient Case studies with questions, sample USMLE questions)

## Assessment

End of Block required surveys

• Add question on asynchronous videos, quizzes and application exercises

Will use the same final essay exam questions for biochemistry.

• Compare Class 2027 to Class of 2026

Focus sessions with students

• Get feedback and attitudes about the new approach

## Results

Themes from End of Block Survey and Focus Groups:

1. Liked the interactive sessions but want more case vignettes and questions.

*"I liked the asynchronous format, but I also don't usually go to lectures."*

*"And I really did like the interactive sessions, because I think it gave me like the language, and to know how those questions should be answered or like how I should approach it. It taught me the thought process of answering those questions which I always think is a good thing"*

2. The short videos were "too short" and needed more basic introduction.

*"Please make the asynchronous sessions one single video instead of 10+ short ones."*

*"I need to know, Steps 1, 2, 3, 4 of the cycle. Let me talk you through it. prior to jumping into like regulation"*

## Results

Exam 2026 (183 Students)	Average Score	Exam 2027 (184 Students)	Average Score
Vignette #2 Urea Cycle		Vignette #2 Urea Cycle	
Question 5	85.60%	Question 4	80.41%
Question 6	72.02%	Question 5	62.19%
Vignette #3 Gout		Vignette #3 Gout	
Question 7	84.45%	Question 6	77.28%
Question 8	85.68%	Question 7	81.79%
Vignette #6 Exercise and Glycolysis		Vignette #6 Exercise and Glycolysis	
Question 14	84.86%	Question 13	90.11%
Question 15	81.86%	Question 14	82.88%
Vignette #8 Fatty Acid Oxidation		Vignette #8 Fatty Acid Oxidation	
Question 17	91.68%	Question 15	89.18%
Question 18	85.63%	Question 16	89.24%
Question 19	92.51%	Question 17	88.70%

Table 1. The average scores for the final essay exam from the class of 2027 (had intervention) compared to Class of 2026 (historical controls).

The tests questions were the same for both classes to test the impact of the new biochemistry curriculum. Vignette #2 and #3 were taught with asynchronous videos and PBL patient cases in small groups (8 students + facilitator). Vignettes #6 and #8 were taught with asynchronous videos and interactive sessions (184 students).

## Future Directions

In response to the focus group discussions and end of block survey questions. We will:

1. Add more introductory information on the pathways to orient the students to the big picture.
2. Make a visual slide of all of the pathways and how they relate to one another.
3. Relate the pathways to preventative medicine.
4. Develop more videos, quizzes and interactive sessions for nutrition and GI portion of the block.