

DISCUSSING COVID-19 AS A CONTROVERSIAL TOPIC
IN CH4500

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COURSE OBJECTIVES

- synthesize knowledge of all their experiences in the chemistry curriculum;
 - develop critical thinking to improve their creativity and problem-solving skills; and
 - develop literacy in some of the major scientific and technological challenges of the 21st century.
- *“Throughout this course I learned about the different research topics in Chemistry Department. I also learned to critically think. I think this was a great time in my college life to learn this” ~ Elyse (spring 2018)*
 - *“Thanks for a great semester of lecturers and thought-provoking projects!” ~ Luke (Spring 2019)*
 - *“Having to read articles and form opinions on them, rather than just reading a textbook and taking a test, is much more engaging in terms of critical thinking” ~ Nick (Spring 2022)*

COURSE STRUCTURE

Guest Speakers

Group Discussions

Writing CV and Personal Statement

GUEST SPEAKERS

- Eight weeks of lectures given by different guest speakers. Each guest speaker will talk about an area in chemistry research.
- Two of which spoke about careers in chemistry
- *“I really liked all of the professors who came and spoke and they all showed a real passion for what they do. I would have liked even more speakers to give advice, rather than just talking about their research.”*

INDIVIDUAL JOURNAL ENTRY

Individual Journal for Guest lectures

- The journal should reflect on what you have learned from our guest speaker. Here are few questions to answer:
- What did you learn from this lecture? Were you familiar with this information?
- Did you find the information interesting? Would you consider working on such research?
- Do you think such area is important to improve our life?
- Did you enjoy the lecture/our speaker?

PAST CRITICAL THINKING ASSIGNMENTS

SPRING 2018

Critical Thinking Assignment (April 11 2018)

Anti-vaccination movement has increased in the United States towards the end of the 19th century. Despite scientific agreement that vaccinations are safe and healthy, many people (including some scientists) believe that vaccinations (some or all) are unnecessary. People also believe vaccinations should not be mandatory and such laws violate civil rights and some religious rights.

(<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1123944/>).

As a final project each group will present to the rest of the class (15–20 min presentation) a very compelling presentation about **either** the benefits of vaccination (you can pick any vaccination(s) you want to support) **or** the dangers of vaccinations (you can pick any example(s) you find). Both presentations should be supported by evidence (statistics, reports, YouTube videos, scientific articles, journal articles, and pseudoscience papers... anything you can logically use to defend your argument).

Every presentation (10-15 slides) should use a critical thinking approach as prompted below:

- Gather, analyze and interpret relevant data presented in your resources to support your argument (vaccinations are important or not).
- Identify key problems (associated with using vaccines or not using vaccines).
- The possible alternatives.

The objective of this project is to establish a healthy discussion about a widely controversial topic as vaccination.

SPRING 2019

As a final project each group will present to the rest of the class (15–20 min presentation) a very compelling presentation about **either** the benefits of keeping the prices of the drugs high and the freedom companies have over those prices **or** benefits of lowering the prescription drug prices, and the importance of the government control over those prices.

Both presentations should be supported by evidence (statistics, reports, YouTube videos, scientific articles, journal articles, and pseudoscience papers... anything you can logically use to defend your argument).

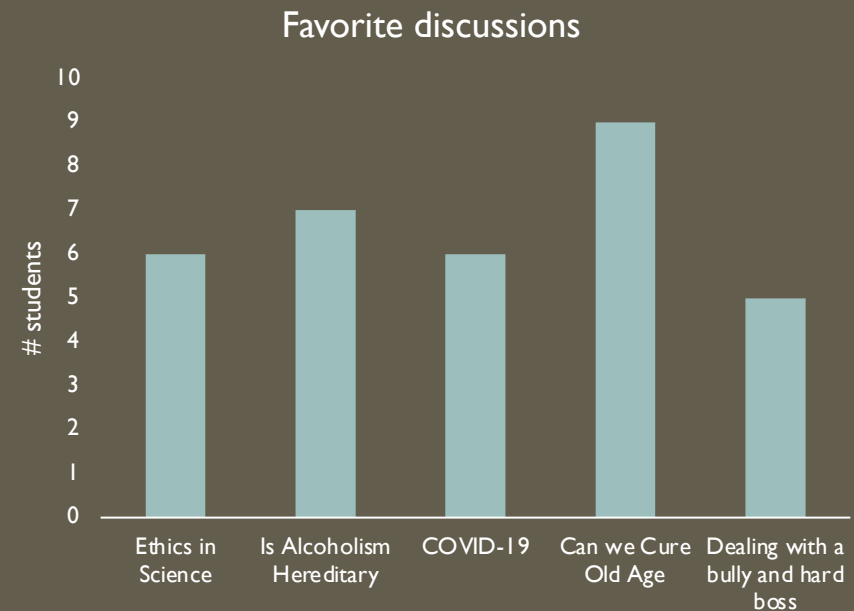
Every presentation (10-15 slides) should use a critical thinking approach as prompted below:

- Gather, analyze and interpret relevant data presented in your resources to support your argument.
- Identify key problems (associated with either increasing or lowering the prices).
- The possible alternatives.

The objective of this project is to establish a healthy discussion about a controversial topic.

GROUP DISCUSSIONS

- Ethics in Science
- Is Alcoholism Hereditary?
- Dealing with a bully and hard boss
- COVID-19
- Can we Cure Old Age?





COVID-19 DISCUSSION

1. The Covid-19 virus, SARS-CoV-2, infects cells by first binding to a protein on the cell surface called ACE2. Why is ACE2 present in the body? In other words, what is ACE2's natural function? What kinds of cells include ACE2 on their surface? In other words, what types of cells may be infected by the SARS-CoV-2 virus?
2. SARS-CoV-2 has evolved into different 'variants' over the past couple of years. The 'delta' variant was more infectious than the original virus and was the dominate form of the virus around the world for months. What chemical (functional group) changes occurred in the spike protein's 'receptor binding domain' (the portion of the SARS-CoV-2 virus that first interacts with the ACE2 receptor) in the 'delta' variant relative to the original virus?
3. Most recently, a new variant called 'omicron' has become the dominant form of the virus worldwide. How many chemical changes (mutations) have occurred in the omicron variant relative to the original virus? How have these mutations impacted the transmissibility of the virus (SARS-CoV-2) and virulence of the disease (Covid-19)?
4. Vaccines have been produced that enhance immunity to and reduce the virulence of Covid-19. In part, this is the result of the vaccine encouraging your body to produce neutralizing antibodies. What are 'neutralizing antibodies' and how do they interact, at a molecular level, with the SARS-CoV-2 virus?
5. Through vaccination and/or infection, herd or community immunity can be achieved against many viruses. What is herd or community immunity, and what factors influence when such a state has been reached in a population?
6. **What is your opinion about the decision of many people to refuse taking the COVID-19 vaccine, please explain your point of view whether you support their decision or do not support it?**

I think forcing individuals to take the vaccine would set a bad precedent.

I believe that it is their choice to become vaccinated or not. I think they are making a choice that they can only make themselves

Those who choose not to receive the vaccine are making the wrong choice

I think everyone needs to get vaccinated, PLEASE!

I do not support the decision to not get the vaccine for most individuals.

I do not understand why this vaccine has such a political element to it because it really should not.

CLASS DISCUSSIONS

THE DILEMMA

I think the topics relating to science were particularly interesting (ethics, Covid-19, etc).

Chemistry Students still like to discuss mainly science topics....

SUGGESTED DISCUSSIONS

- Gender and Racial Issues in Science/The Workplace
- Mental Health
- Media and science (pop science and misconceptions)
- Climate Change
- Chemistry in sports

MORE FEEDBACK ABOUT DISCUSSIONS

- It was interesting to see all of the different opinions when discussing these topics. I think this was helpful in practicing how to debate and communicate over the given evidence. I think it was also interesting to see how people had different opinions on based on their experiences. For example, with the alcoholism discussion, I mentioned to my group how I stay away from alcohol most of the time as I grew up in a family of alcoholics so that experience makes me not desire to drink alcohol. But other people in my group who did not grow up like that had less concern. It was interesting to notice that.
- I think these discussions offered a way to hear other perspectives openly as opposed to in a more argumentative way. People were allowed to share their opinions without fear of being attacked after and I think that let them be more honest and open.
- I enjoyed the discussions we had because the papers presented both the for and against arguments for the topic so it wasn't biased towards just one opinion.

QUESTIONS?

Thank you!