

INTERNATIONAL VIRTUAL CONFERENCE ON TESOL

English Language Teaching in the Era of Globalization 4.0:
Embracing Challenges and Innovations

An Innovative and Collaborative Approach to CLIL

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Ford Festiva



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Embracing the Challenges and Innovations

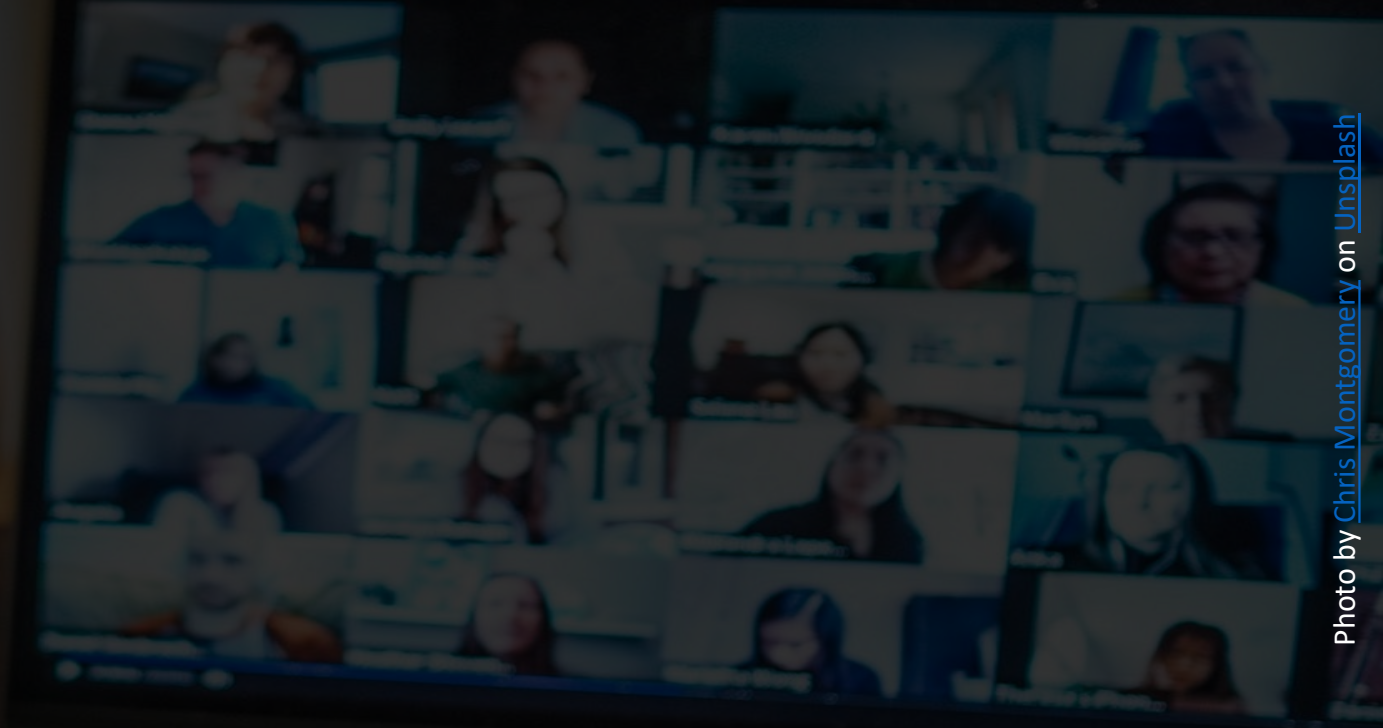


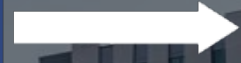
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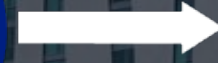
Context



HIGH SCHOOL



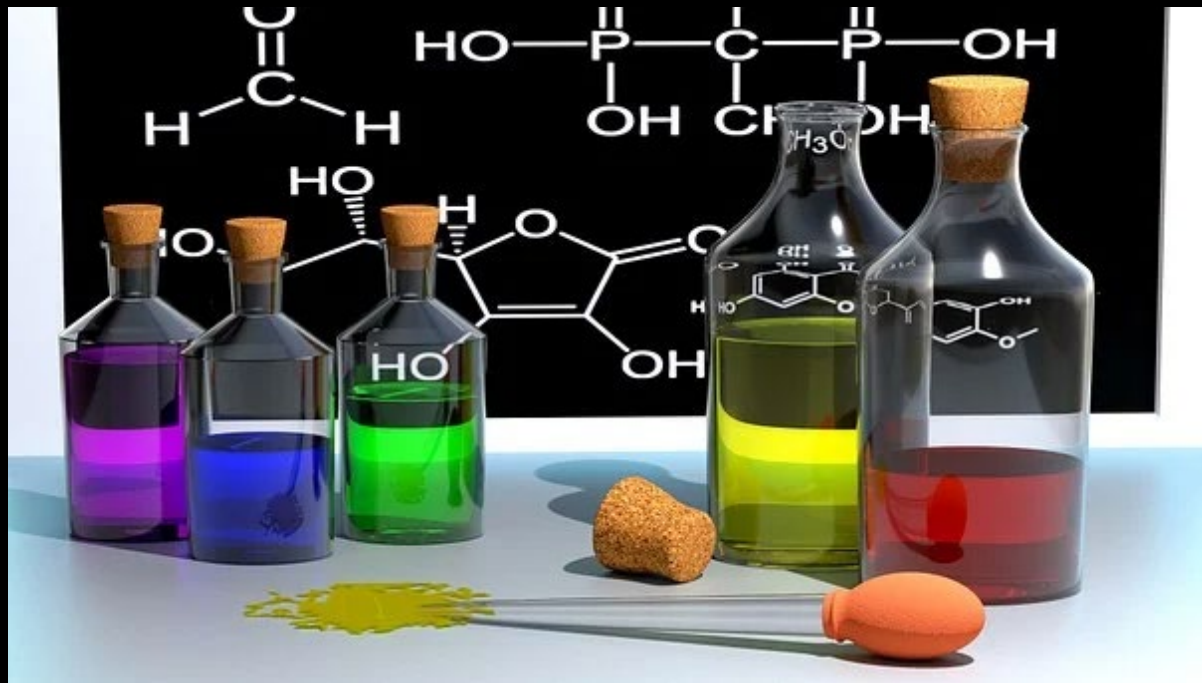
UBC VANTAGE ONE
PROGRAM



SECOND YEAR
OF UBC DEGREE



Embracing the Challenges and Innovation



*Noticing



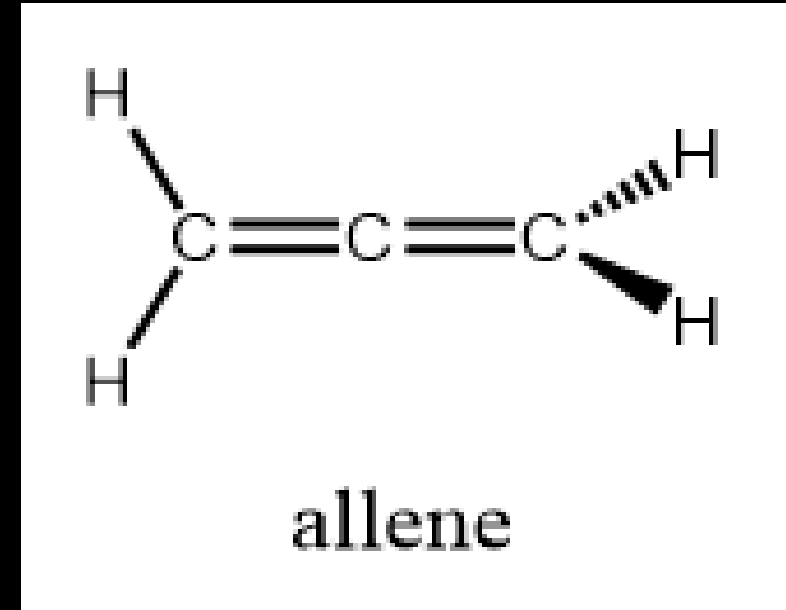
*Conversations



*Collaborations

We **noticed** three issues:

1. **Lower assessments:** EAL students who excelled in class (F2F), received lower grades on assessments than all other students.
2. **Target language usage:** EAL students tended to use L1 during group projects and labs.
3. **Presentation of concepts:** Three-dimensional chemistry objects and concepts are often presented as 2-D in texts.



Chemistry instructor and I **discussed** the three issues:

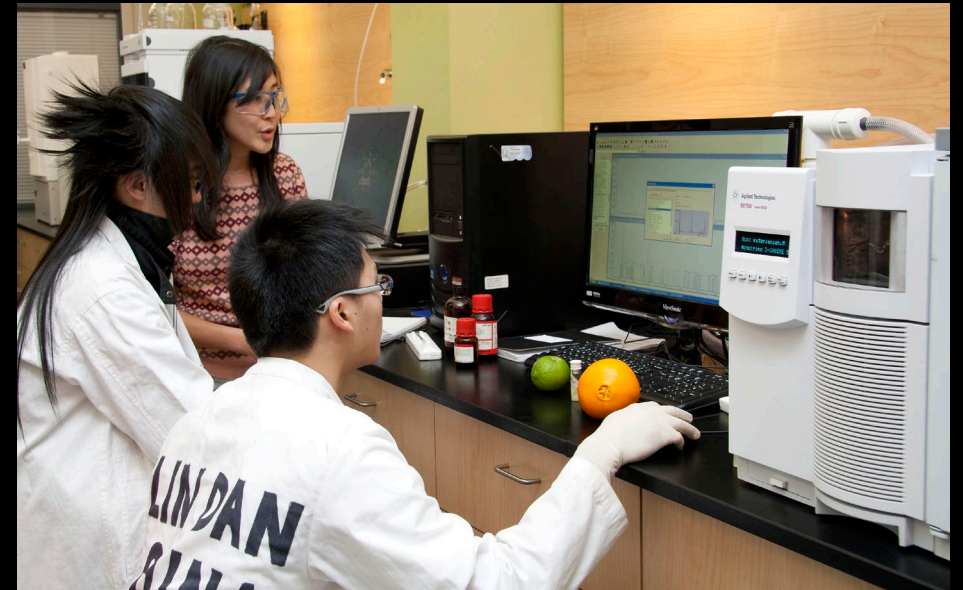
Students' vocabulary knowledge included

- **Chemistry** related content vocabulary
- **Procedural** related vocabulary

Students' vocabulary knowledge lacked

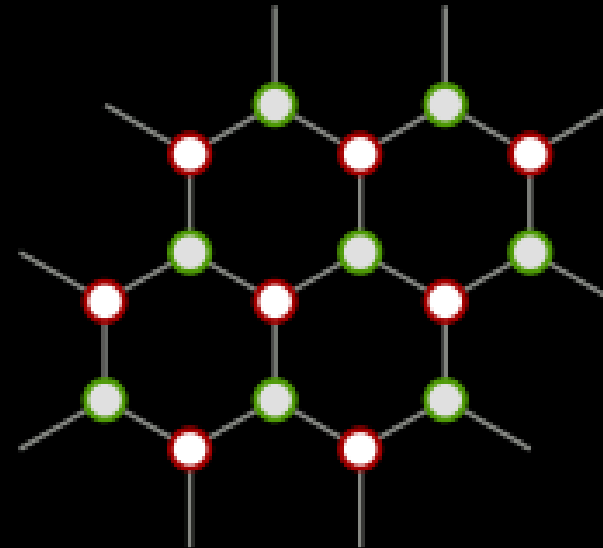
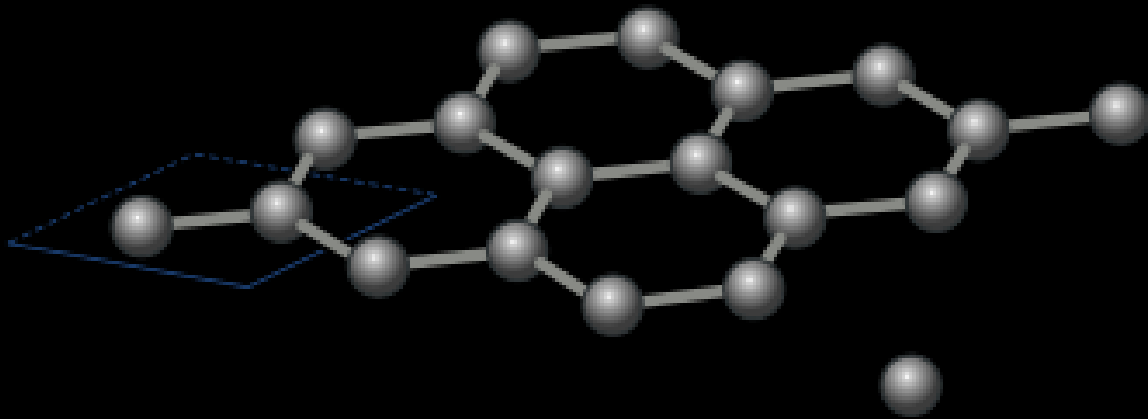
- **Spatial** related vocabulary
(issues were compounded by presentation mode)

*Easy fix: Provided spatial related vocabulary



Example of spatial vocabulary

All the atoms are on the same plane.



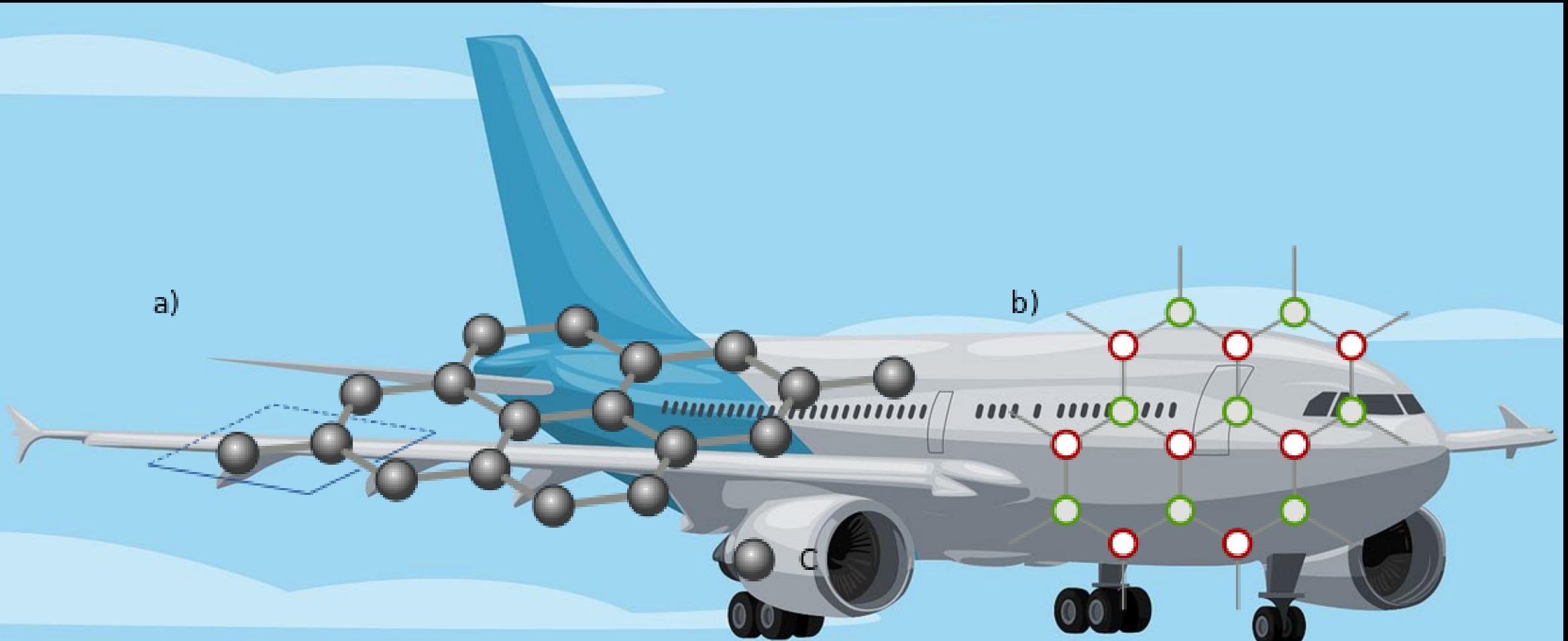
Example

All the atoms are on the same plane.



Example

All the atoms are on the same plane.



Collaboration

Chemistry instructor assisted with building the required vocabulary

I was left thinking about how we could provide one lesson that address all three issues:

1. **Lower assessments:** EAL students who excelled in class (F2F), received lower grades on assessments than all other students.
2. **Target language usage:** EAL students tended to use L1 during group projects and labs.
3. **Presentation of concepts:** Three-dimensional chemistry objects and concepts are often presented as 2-D in texts.

Vantage One

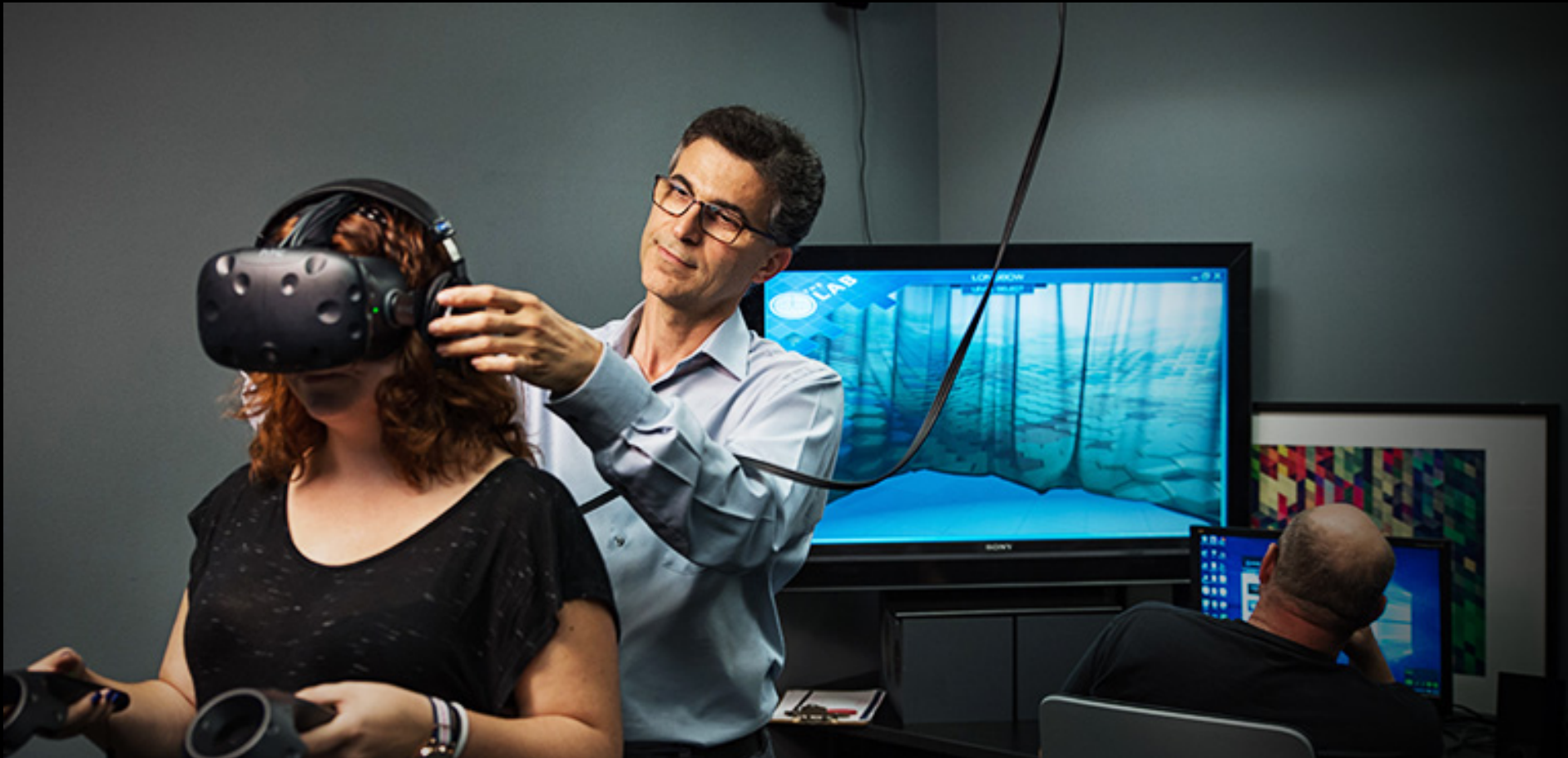


Goal: Create a collaborative activity between Chemistry and the Academic English Program that

1. simultaneously improves students conceptual understanding of chemistry and
2. their ability to describe chemical phenomena in English.

CLIL – Chemistry

Virtual Reality.



Virtual reality

- Provided us with an immersive 3-D environment that could address all issues
- All we had to do was build an activity in which students were required to:
 - use their newly gained vocabulary
 - communicate with peers in the target language, i.e. English
 - work with chemistry objects in a 3-D environment.
- ***Easy fix:** Provided spatial related vocabulary
- **Provide** the students with an environment that they could apply the vocabulary

The Challenge

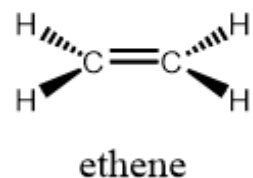
- Students worked in groups of 3-4 to solve chemistry-related questions.
- The questions built on each other.
- Each student took a turn using the virtual reality headset.
- The team had to work together to help direct the student in virtual reality.
- After completing each model, a TA asked the team to answer a series of verbal questions to relate their diagrams to concepts in chemistry.



Group Instructions:

For the next hour, you and your teammates will work together to solve four chemistry-related problems. For each problem, a different student in your group will wear the virtual reality headset. While only one student will be wearing the virtual reality headset at a time, your entire team should work together to solve each problem.

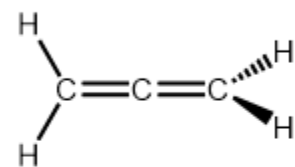
When the first student enters the virtual reality environment, you'll see a model of ethene that has already been drawn for you.



Green lines have been used to represent the **sigma bonds**. The **pi bond** between the two carbon atoms is represented by the **overlap of p orbitals**. **Red** has been used to represent the **positive phase** of a **p orbital** and **blue** is used to represent the **negative phase**. Please use these same conventions when drawing your own models.

Problem 1:

The model of ethene that has been drawn for you shows that all 6 atoms lie on the same plane. In a closely related molecule, allene, two of the hydrogen atoms lie on a different plane than the rest of the atoms, as shown below.



allene

Using the same convention described in the group instructions, modify the structure of ethene to create a model of allene. As a group, use your completed model to:

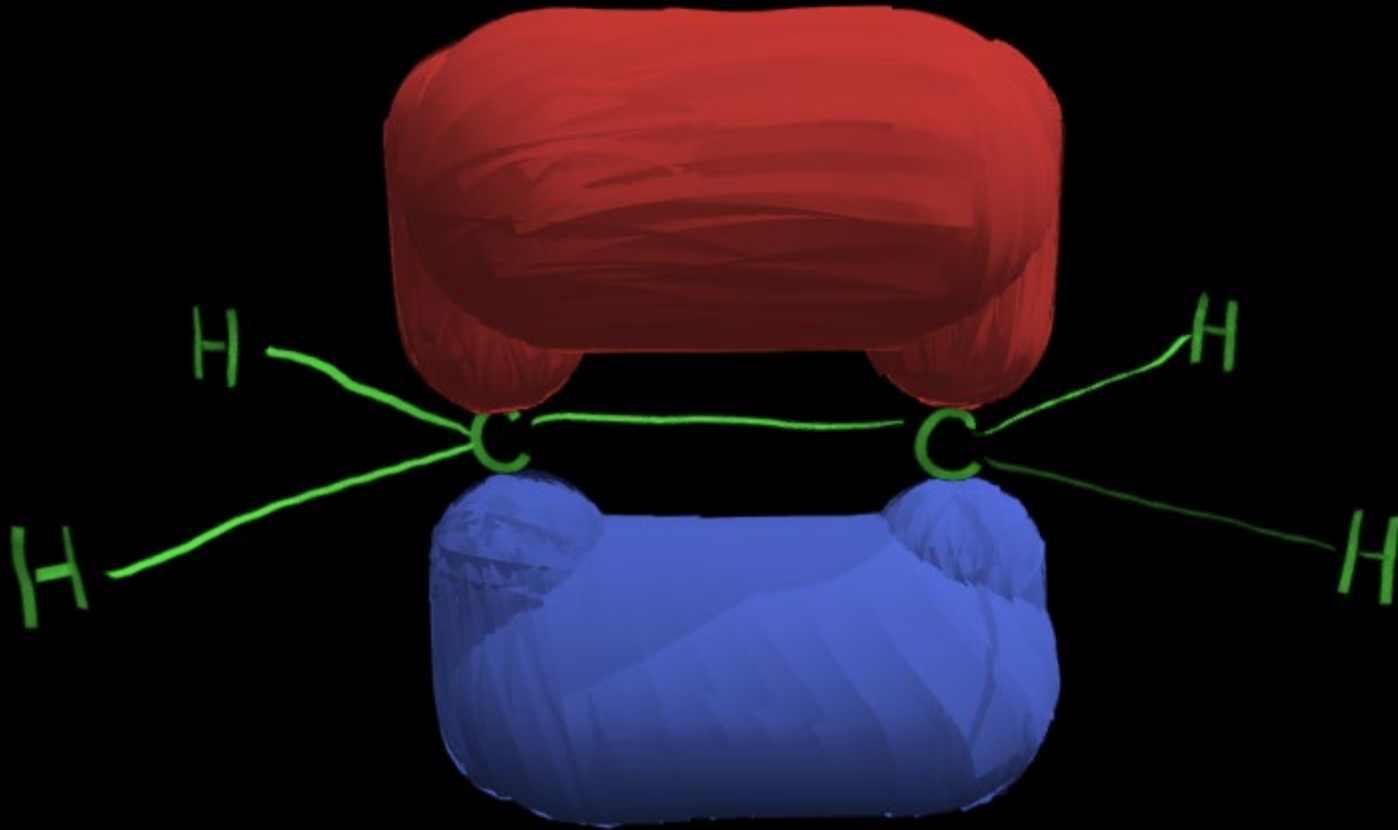
1. **Describe the hybridization** of each carbon atom.
2. **Explain why** the two sets of hydrogen atoms in allene lie on **different planes**.

Export your model before continuing to Problem 2.





Using Google Tilt Brush to Draw Orbitals



The **Team View** vs Virtual Reality View

The *Virtual Reality View* vs Team View

DOES VIRTUAL REALITY HELP ACADEMIC PERFORMANCE?

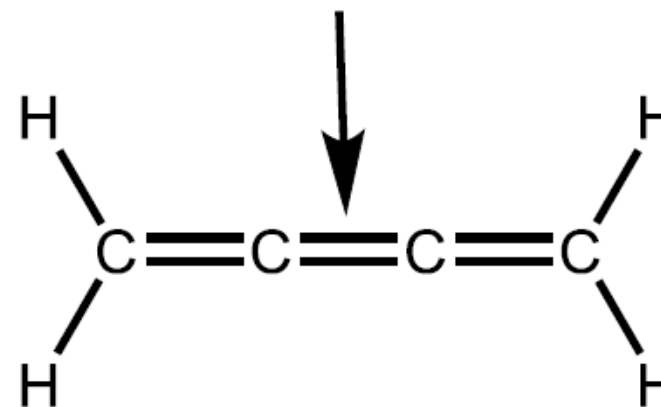
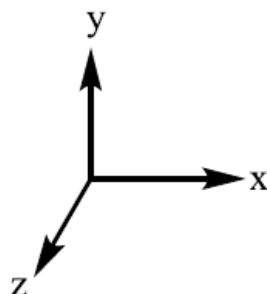
Two questions presented in an in-class chemistry quiz (1-week delay)

Based on the given axis system, which p orbitals form the indicated bond?

A. p_x-p_x

B. p_y-p_y

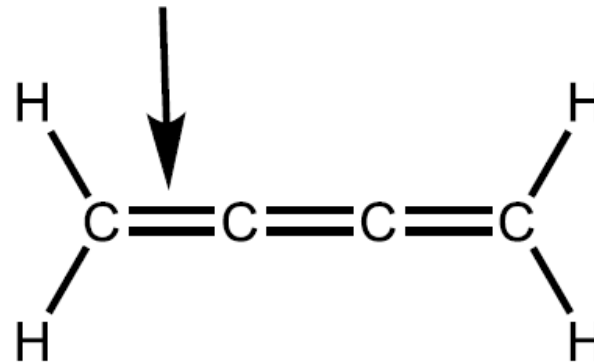
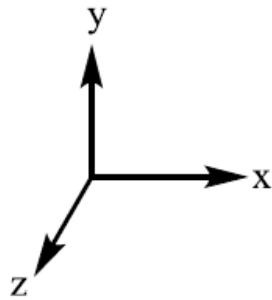
C. p_z-p_z



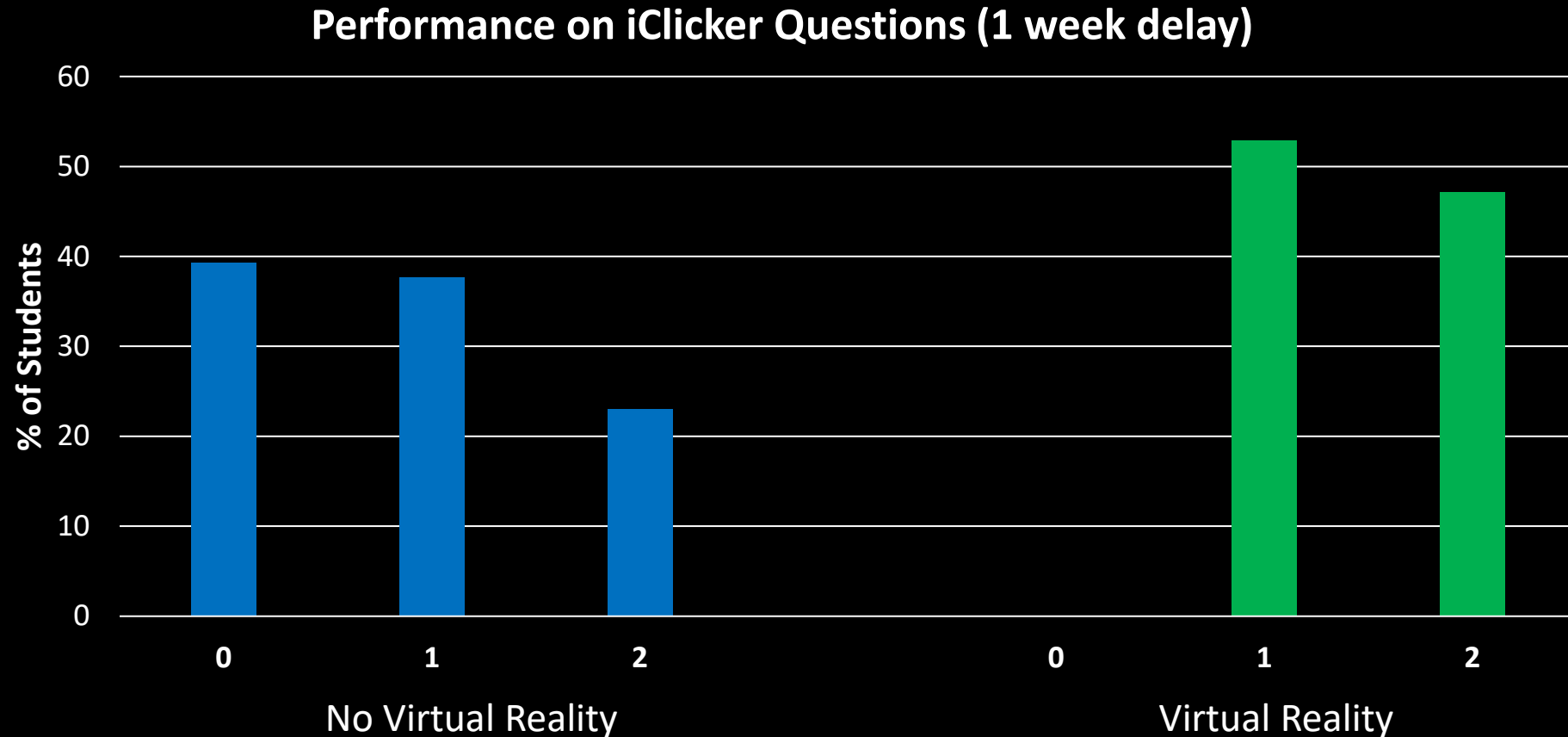
Does VR & CLIL Improve Academic Performance?

Based on the given axis system, which p orbitals form the indicated bond?

- A. p_x-p_x
- B. p_y-p_y
- C. p_z-p_z



Does Virtual Reality Help Academic Performance?



$$\chi^2 (2) = 10.2, p = 0.006$$

Takeaways

*Noticing



*Conversations



*Collaborations



Takeaways

Exploratory questions:

Do students need what I teach?

or

Do I teach what students need?



Acknowledgements

- UBC
- Vantage College
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- Brian Wilson
- Emerging Media, UBC



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Thank you

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