Intro to Chemistry TAing

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PART I: Chemistry TA SharePoint and other useful websites

SharePoint

The chemistry TA SharePoint website provides a place to create, share, and archive documents and grades. To access this website, please do the following:

1. Sign into your account at access.caltech.edu.
2. Select “SharePoint” (in the Communications Services category).
3. You should now be at Caltech SharePoint Home. Select “Chemistry & Chemical Engineering” from the Academic Division list.
4. Select “Chemistry TAs”.
5. Use the dropdown menus at the top of the screen to select the course you are TAing. You can now access resources from previous years and upload your own!
6.

Regis

Regis is used for online course enrollment and accessing grade reports. As a TA, you can also use Regis to obtain an email roster of the students in your course. To access this feature, please do the following:

1. Sign into your account at access.caltech.edu.
2. Select “Regis” (in the Academic Services category).
3. Select TA Class Roll Sheets from the menu on the left. Choose the academic term, course, and section you are interested in.
4. You should now be able to view a list of all enrolled students and their email addresses.

Moodle

Some professors use Moodle to distribute course materials and track grades. To access this site, please do the following:

1. Sign in at courses.caltech.edu with your email account username and password.
2. Select the appropriate course from the menu on the left.
3. If the course you want to access is not listed, you will have to enroll yourself. Do so by selecting it from the main course list (under “Course categories”) and then entering the enrollment key (obtained from your professor)
4. Access course materials, grading, etc.

PART II: Making handouts for your recitation or office hours

A "handout" is a document prepared by the TA and distributed to students. It includes explanations of concepts and example problems. Handouts are not required, but they are very helpful for a number of reasons. Some chemistry classes (for example, Ch1a and Ch1b) have handouts from previous TAs archived in the SharePoint site. Use them and add to them! …and don't forget to upload yours to SharePoint.

Not giving a recitation? Making a handout or cheat sheet for each lecture or problem set can help you prepare for your office hours.

Why are handouts useful?

For students:

- An easy reference when doing homework and studying
- Pinpoints the most important or challenging concepts
- Shows that the TA is invested in their position as TA
- Provides additional sample questions for the students to work through

For TAs:

- Aids in preparing for recitation or office hours
- Helps boost your confidence in recitation or office hours
- Shows the students that you are invested in your position as TA
- Keeps you on track and conscious of the topics you want to address

Qualities of a good handout:

- States and briefly describes important concepts
- Mentions assignment due dates, review sessions and other class happenings
- Draws attention to the most important points with font and/or style changes
- Does not include *everything* – you still want the students engaged with you and coming to class. For example, use fill-in-the-blanks for definitions and descriptions of concepts.
- Includes enough white space for students to add their own notes
- Includes practice problems
- Includes figures – don't forget to cite your sources!

Handout Tips and Recitation Techniques

- Limit the amount of text and use bullet points when possible
- Provide more than just a series of rules or steps. In recitation, you **should** go into detail if it furthers understanding and interest
- Do not simply read and breeze through the handout. For you, this is a starting point, not a script.

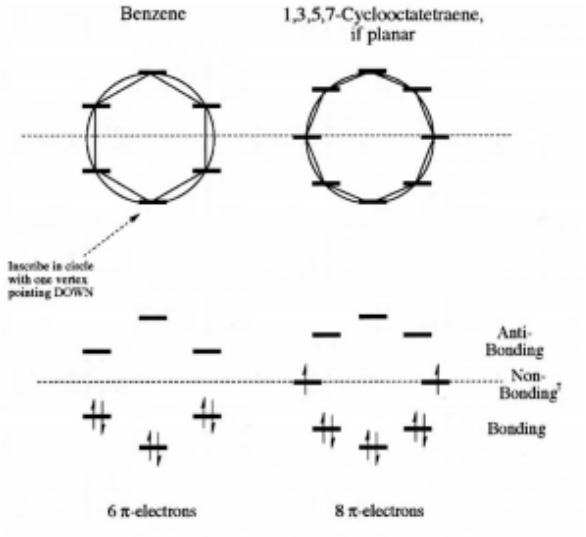
See the example on the next page and briefly discuss the good and the bad aspects of this handout

Nodes in a pi system

- The sign of the orbitals always changes when _____
- More nodes = _____
- The final distribution of nodes must be either _____ or _____
- A node CAN be placed through an orbital or orbitals

Nodes in cyclic pi systems: Frost Circles

1. Draw the polygon with vertex pointing down. The polygon should have the same number of vertices as the number of atoms in the ring of the molecule.
2. Place horizontal lines at each vertex of the polygon to denote the positions of molecular orbitals. MOs that lie on the same horizontal line are degenerate.
3. Draw a line that divides the circle/polygon in half.
    a. Orbitals below this line are bonding
    b. Orbitals on this line are non-bonding
    c. Orbitals above this line are anti-bonding
4. Fill in the available pi electrons
5. To draw the MOs, first consider the number of nodes. The bottom MO has no nodes. Each degenerate set of MOs above the bottom MO gains another node.



http://chemistry.wlu.edu/WebPDF/242/241%202003/Frost'sCircle.pdf

Nodes in linear pi systems

1. Decide how many rows you will have. You will have as many rows as there are atoms involved in the pi bonding. For example, 4 conjugated atoms means 4 orbitals and 4 rows.
2. Draw the orbitals in each row. Do not shade the orbitals yet.
3. Draw the nodes in each row as vertical lines on or between orbitals. The first (bottom) row has zero nodes. Each additional row has one more node than the previous. So, the second row has 1 node and the third row has 2 nodes. The last (top) row always has a node between every orbital.
4. Shade the orbitals such that orbitals between nodes are all the same phase. Orbitals with a node in between are opposite phase.

Space to work through an example of nodes in a linear pi system with students

Practice problems

1. For each of the following linear pi systems…
    a. Give a line-bond sketch of the molecule
    b. Indicate the hybridization at each individual carbon
    c. Give a sketch of the pi orbitals
    d. Indicate if the system is a continuous pi-bonding system

PART III: Making quiz or exam questions

Depending on the course, you may be asked to write quiz and/or exam questions from the person who is writing the quiz or exam, usually a professor or a Head/Content TA. They will usually ask for questions (and solutions) from a number of TAs, edit and combine any number of the new questions mixed with previous years' questions, send the draft to reviewers, then put together the final quiz/exam. The chances that a new question appears on a quiz/exam depends on a variety of factors, such as the quality of the submitted question, the availability of reusable questions, the goals of the quiz/exam creator, and their available time.

Why take the time to write a good question?

- A chance to think deeply about the concepts that students are required to learn and integrate, which also helps prepare for office hours and recitations
- An opportunity to be creative, showcase your own interests, and educate students on a topic you find interesting
- If you want your question to appear on a quiz or exam, a better question will be easier for the content creator to edit and incorporate the question

Qualities of a good question:

- Difficulty level is appropriate: not too easy and not too difficult; may target any or multiple levels of cognition (e.g. knowledge, comprehension, application)
- The wording is clear and concise; question specifies the level of detail to receive full points (especially if full points is not automatically awarded for the correct answer)
- Figures, text, and equations are legible with black and white printing
- The solutions specifies a breakdown of points assignments for various sections of the question, particularly if it is worth many points
- The solutions key is clear and has a level of detail that tries to maximize consistency between TAs (point assignments should be as unambiguous as possible without being too wordy). If needed, a separate solutions key with notes to grading TAs is supplied in addition to one meant for students
- Citations are included where needed (e.g. image source, publication reference)

Question-writing tips:

- When looking for inspiration and a foundation for your question, review concepts relevant to the quiz/exam and resources such as course textbooks, lecture slides, past quiz/exam problems, handouts, online resources, research publications
- Be careful to not plagiarize if you are basing your question on a textbook, online, or past exam/quiz question (the structure/content of the question should be different, not only a few words or the numerical values alone)
- During revision, solve your question pretending you are the student and check for text and numerical typos in your question *and* solution before submitting
- Past quizzes/exams can help you decide the total points your question is worth

PART IV: TA panel

Resources

Who should you contact if you are struggling with your TA assignment?

- Your professor or head TA
- Former TAs, if they are willing to help out
- Center for Teaching, Learning, and Outreach (CTLO)
- Jenn Weaver: Associate Director of CTLO (jweaver@caltech.edu)
- Cassandra Volpe Horii: Director of CTLO (cvh@caltech.edu)
- Alison Ross**:** Grad Option Manager (aross@caltech.edu)
- Dean Weyman: Associate Dean of Undergraduate Students (kweyman@caltech.edu)
- Brian Stoltz: Graduate Faculty Representative (stoltz@caltech.edu)
- April Castañeda: Title IX Coordinator (TitleIXCoordinator@caltech.edu)

Chem 1a / 1b Resources

- Christian Goodnow (cgoodnow@caltech.edu)
- Dylan Freas (dfreas@caltech.edu)
- Gracie Zhang (gzhang@caltech.edu)