

Effective recitation: helping your students learn

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Session objectives:

- Effective practices for running recitations
 - Strategies for planning a recitation
 - Classroom management and practicing common scenarios
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What is a Recitation? Usually, it is a weekly session led by a TA separate from course lectures to explain in more detail important concepts and answer student questions.

Other names: breakout, section, tutorial

Difference from office hours: More structured with better preparation, often with a short lecture by the TA.

At Caltech, recitations take many different forms depending on the class. Many large classes have several TA's presenting established recitations with activities and well developed materials. Other courses might have very little material to build on, and the design of the recitations will be largely left up to the TA. Regardless, the goal is always to help the students learn the material during the fast-paced quarter system courses.

Things to know before giving a recitation

Designing a recitation (see example recitation materials):

1. Pick 2-3 goals for the recitation. Consider what important content needs to be reviewed or if a certain type of problem or skill will be on an upcoming exam.
2. Write an actionable plan or outline, including time estimates to achieve your recitation goals.
 - a. Consider what type of teaching style will be most effective. You could lecture at the board, lead a class discussion, have students work on an activity in small groups, etc.
 - b. To make the best use of time, start by reviewing key concepts then progress to less central content. If students have trouble with important concepts you can skip the other material and focus on what is most important.
3. Write a set of notes for yourself or make a handout for the class.
4. Ask for feedback! Designing and leading recitations takes practice.
 - a. You can ask your students for feedback during recitation by asking them if they understand the material and in midterm surveys. You can also ask fellow TA's, the class's professor, or the CTLO to review your recitation plans or to sit in on a class

General recitation outline (also see example recitations)

- **Introduction:** Welcome and state the week's topic.
 - Discuss importance of week's topic and relate to previous content (contextualize).
 - Solicit general questions.
 - State outline/goals of this recitation.
- **Clarify** any confusing or misstated material presented in lecture.
- **Activity/Review** of key concepts.
 - Build up to advanced or integrated concepts.
- Final wrap up and **summary**. Solicit general questions.

Other tips for preparation

Reviewing lecture:

- First, **go to lecture!** During class, write down things that are confusing to you. Clarify with the professor.
- Use the course textbook (or alternative texts or internet articles) as references to explain the concepts in a different way.

Reviewing past HW:

- It helps to **look at the HW** to see what concepts the professor is focusing on.
- People will approach problems in different ways - look at their work and briefly summarize the different approaches. Recap what strategies worked for people, and what approaches could have been improved.
- Look for common conceptual mistakes, especially when it is likely to keep showing up in the course. Emphasize to students it will be worth learning correctly early on.

Anticipating questions:

- If a question has been asked before, it will probably be asked again. This includes questions from lecture, office hours, and even past years of the course.
- Usually a professor can't offer a thorough answer to the questions that students asks in the class due to the time constraint. Be prepared to elaborate.
- Encourage people in your section to e-mail you ahead of time when they are having trouble, or if they simply want a specific topic covered.

Preparing examples:

- Don't just do problems that are basically the HW but substituting a number here or there. Look for different problems in other textbooks, or even (gasp!) google or Wikipedia, or if you are ambitious, come up with your own.
- It helps to actually do the HW without looking at the solutions. If there's a part that isn't immediately obvious to you, it will probably cause the students a lot more time and frustration. Take notes of these parts and use them as a basis for creating example problems or recapping lecture concepts.

Time management:

- This is hard to get right the first couple times – be aware that it will take some experience to judge the proper pace of your section and how much material to prepare. Try to develop your own rules of thumb. For example, a page of my recitation notes takes about 15 minutes so I would try not to cover more than 4 pages.

Things to know while giving a recitation

Keep in mind

- As a TA and relative expert, you have the power to **contextualize**. You can give meaning to the seemingly random weekly topics for the students.
- Time management: be ok with not covering everything you planned. Sometimes key concepts will take longer than expected to explain, but try not to waste time on nonessential topics.
- Practice good **public speaking**: Talk confidently while facing your audience (do not face the board)
- The TA should be an expert compared to the student, but cannot possibly know everything. Admit when you don't know something, and try to **follow up** by email.
- Caltech undergraduates are often under a lot of stress. Your job is to help them learn, not be their enemy. Try to be understanding and professional.

Practical Classroom Management Strategies

1. No One is participating - *Call on a specific person, rephrase the question, or give students time to think (wait 10 seconds).*
2. Telling a student they're wrong - *Gently with a neutral, observant tone. "No, but I can see why you think that."*
3. Irrelevant Questions - *Follow up on later. "That's an interesting question, but let's talk about it more after class"*
4. Disruptive students - *Address early on and politely. Keep students engaged, but make them work individually if necessary.*
5. Student corrects you - *Treat them with respect, and try to make sure other students understand. "Thank you, you're right. Is that clear to everyone?"*
6. You don't know the answer - *Stay confident! The answer might not actually be known. Offer to follow up by email after doing some research.*

Bi1: Week 1 Recitation TA Notes

Introduction, diversity of life, origins, and evolution

Learning Goals

- Differentiate between a good and a bad hypothesis
- Identify the hypothesis and experiments in a paper
- Consider how we can observe Darwinian evolution in both bacteria and humans

Outline for Students – to be written on the board

- Turn in pre-recitation activity
- Introduction to the writing assignment
- Hypothesis and interpret data from the Rainey & Michael Travisano paper

Implementation

- Introduce yourself and the writing TA. *Small icebreaker or introductions for the class.* (5 mins)
- Writing assignment introduction by writing TA. *During this time you can check off students who turned in their pre-rec assignment and comment on hypothesis.* (~10 minutes)
- Pre-rec activity discussion. *Hand back assignments and give the students a few minutes to discuss with a peer how they could improve their hypothesis. Then discuss as a group changes students made.* (~5 minutes)
- Recitation Activity: Hypothesis and data interpretation of paper. (~25 min)
 - *Lecture Recap: Evolution and Niches*
 - *Background info for activity*
 - *Break the students into small groups and then come back together to discuss the answers.*
- Briefly discuss human evolution and arsenic (~5 minutes)

Content

Clarifications from Lecture

[Take Notes Here]

Essential Background for Recitation

- Required reading: Adaptive radiation in a heterogeneous environment
- Recommended reading: *An Unlikely Driver of Evolution: Arsenic*

This TA outline was accompanied by a worksheet - the 'Recitation Activity,' and detailed notes on the content of each outlined section. Credit: Sofi Quinodoz