INCLUSIVE PEDAGOGY: OLD & NEW

a handbook for inclusive teaching strategies in the Chemistry Department

compiled by Nicole Chung '22

Sources:
HSTEM Handbook 2019
Conversations with:
151: Professors O'Hara, Burckett, Jaswal
161: Cartier, Ampiah-Bonney, Durr
221/231: Hansen, Reutenauer, Lopez, and Bishop
Inclusive Pedagogy Strategies

- Categorization tree
- Past practices can inform and build foundation for new strategies

New Strategies

- Inclusive Pedagogy
  - Assignments + Course Structure
  - Community
  - In the Classroom
    - Lecture
    - Section
    - Lab
    - STEM Incubator
  - Cheminard
Mixed Partners each week exposes students to partners they might not otherwise get to know or work with; prepare for a diverse work environment during/after college.

Introduce the professor & go-round introductions on Day 1 of lab:
- Humanizes the professor and gets everyone acquainted in a smaller classroom setting; establishes community in an academic context.
- Ask questions that feel genuinely engaging and thought-provoking, rather than obligatory. Try out "What is your favorite element?" "What type of weather matches your mood today?" "What smell do you associate with your home?"
**LECTURE**

- **Clicker questions**
  - foster student participation and encourage in-class discussion, especially in a large lecture setting

- **One-minute sheets**
  - encourage students to reflect upon core concepts and serves as a regular feedback source for faculty

- **First Lecture: Professor's story**
  - models what it means to be human in STEM and transparentizes a career in STEM/academia
  - shows that class is not just about learning material, but also about building connections and interpersonal skills
  - dedicate a slide or two to your story; emphasizes our humanity is not an aside, but rather a centerpiece of our identities as scientists
Small group format

- employed by 161; students meet in pods of 3-4 and are deliberately paired up to cultivate new friendships and diversify social circles
discourages "plugging and chugging" - rather, students learn from each other, and learn by verbalizing their thoughts and questions

Low stakes environment, exam-level problems

- students can relax knowing that work is graded solely for completion, not correctness, and feel unafraid to ask questions or make mistakes
- professors and TAs are approachable and accessible figures open to answering questions, not simply giving a "second lecture" or supervising group work
Structured time outside of class

- Professors provide scheduled and by-appointment hours to answer questions, solve problems, and review key material.
- Professors encourage small group discussions and answers questions equitably, ensuring that no problem goes unsolved.

TA Drop-in hours

- TAs serve a key role as student liaisons who have previously taken the class.
- TAs are not just peer educators but also mentors and friends; TAs provide an unfiltered perspective on what concepts will be important down the road, both in STEM at Amherst and in the professional world.
Provides a welcoming environment for Summer Science students (and other invited students)

- **weekly scheduled meetings for two hours** to focus on weekly material, get extra practice problems, and **emphasize asking questions**
- Professor and TA work hand-in-hand to **provide academic and emotional support** for students as they progress through the Chemistry introductory sequence
Community hour
- Provides space (digitally and emotionally) to build community and make connections with Chemistry faculty, majors, and staff.

Seminar Presentations
- Give students an idea of possible career paths in STEM and actively fosters representation in the sciences.
- Directly links to being human in STEM by highlighting speaker's journey in chemistry.
- Professors can help plug the event in lecture and elucidate the connections between course material and real world-applications.
Incubator Program (pilot)

- **undergraduate research opportunity** for rising sophomores in 2020
- students can build **meaningful connections with professors** all while learning fundamentals of research techniques; **entry point for research-interested students**
- **colloquium series** highlights **alumni** who have conducted relevant work in chemistry/BCBP, **and thus directly models being human in STEM**
- **Q&A series** follows each lecture to open up conversation between students and alumni
Welcoming environment from the getgo

- "Respect for Persons" statement incorporated into syllabus as a way to establish values of respect, equality, and community early on.
- Distribution of a "Welcome email" after the first lecture with relevant Moodle links, resources, and office hours.

Small assignments graded for completion

- Utility value writing is an anonymous way to improve student writing in STEM and offer students the chance to illustrate how concepts show up in everyday life.
- Exam wrappers encourage students to reflect upon the most effective and most detractive study methods and establish new strategies for future use.

Solicitation of feedback

- Leave in-class time for mid-semester and end-of-semester check-ins to show that feedback is an integral and ongoing aspect of the Chemistry curriculum.
NEW STRATEGIES

Building off and budding from inclusive pedagogies of the past, these new suggestions may be incorporated in the upcoming remote semester and/or for the foreseeable future.
NEW STRATEGIES

1. **Take one-minute sheets to the next level.**

   **"One-Minute Sheet Videos"**

   - Created by Professor Hansen in response to one-minute sheets during S2020 semester.
   - Videos address the most recent one-minute questions, in addition to solving homework problems, section problems, and providing step-by-step guides to exam-level problems.
   - Provide clarifications to common questions on a regular basis, and create an easy avenue for students to get help without having to "show up" for remote office hours.
   - TAs can play a helpful role by coding and organizing past and current videos into a "table of contents," accessible both as an archive and an ongoing resource for students.

- Small groups in discussion
  - Zoom makes it easy to maintain the "small group discussion" feel through **breakout rooms, which can be pre-assigned**
  - Students can **collaborate via Google Docs** while the professor and TA **circulate throughout the breakout rooms to answer questions**

- Post-lecture quizzes
  - If post-lecture quizzes are being used to evaluate student learning remotely and/or to encourage students to stay in step with the course pace, make lecture quizzes count for **completion, not correctness**, while also potentially using answers as an index for how students are learning.
3. Use homework assignments as an opportunity to encourage real-world connections and highlight HSTEM concepts.

**"Teach it to someone who doesn't speak chemistry."**

- Assignment asks that students walk through a class concept with a peer unfamiliar with chemistry/STEM in general; e.g., prepare some slides and a five-minute lesson.
- By teaching the concept to someone else, students progress towards mastery of the material, and build communication and presentation skills along the way.

**Hold discussion forums on articles/podcasts**

- Professors can assign a weekly article or podcast that connects a course concept to a relevant real-world story or quandary.
- Make the first assignment mandatory so that students understand the depth and potential of an activity like this and make optional for the rest of the semester.
- For mandatory assignment, all students upload a short paragraph response to Moodle forum/comment on another response.
- Extend/pair this idea with a biweekly/monthly journal club that discusses the optional reading/podcast/material.
- Possible topics include implicit bias in science, forgotten heroes in Chemistry, Nobel prize winner life stories, etc.
Thank you!