



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

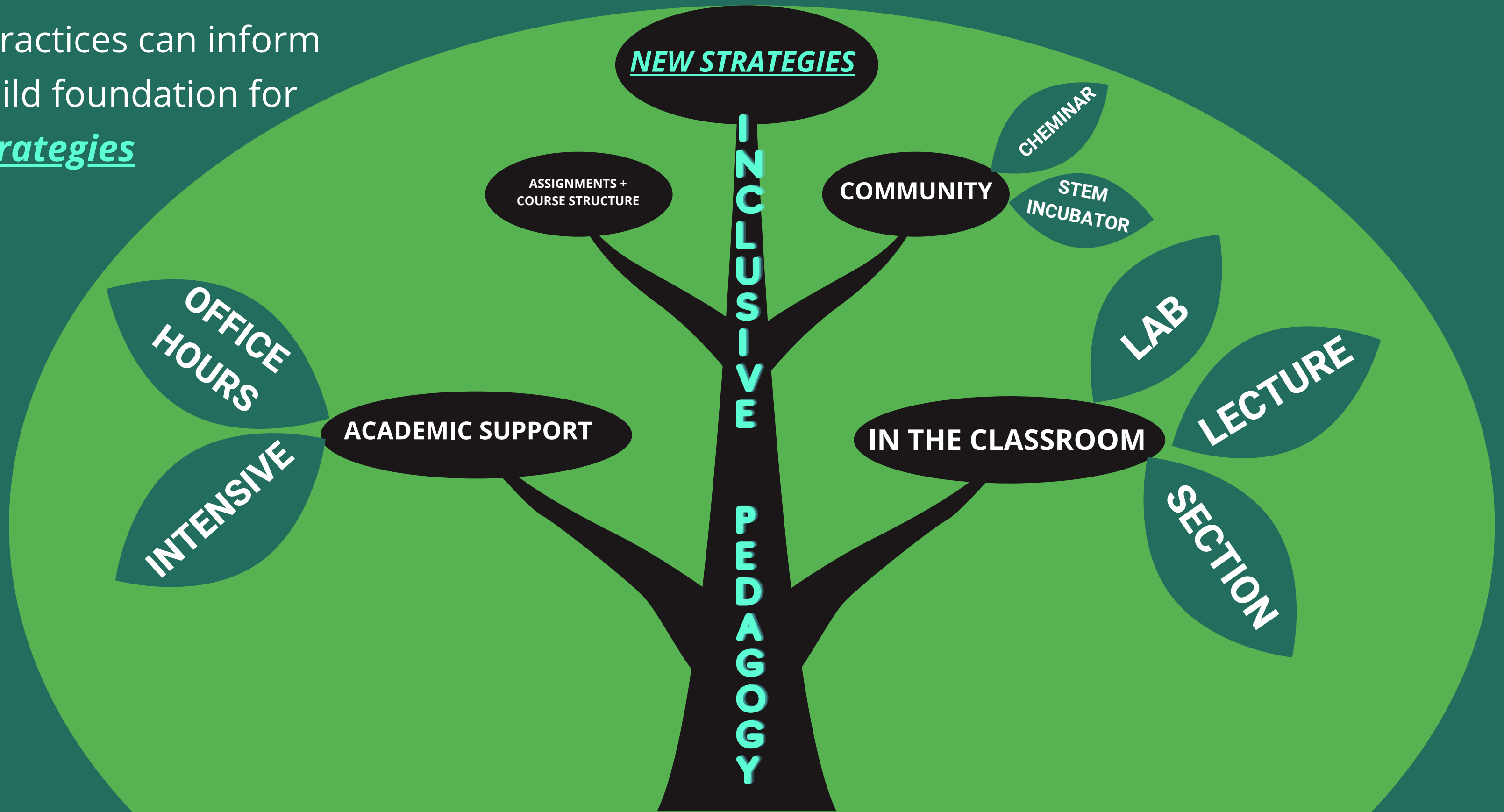
161: Cartier, Ampiah-Bonney, Durr

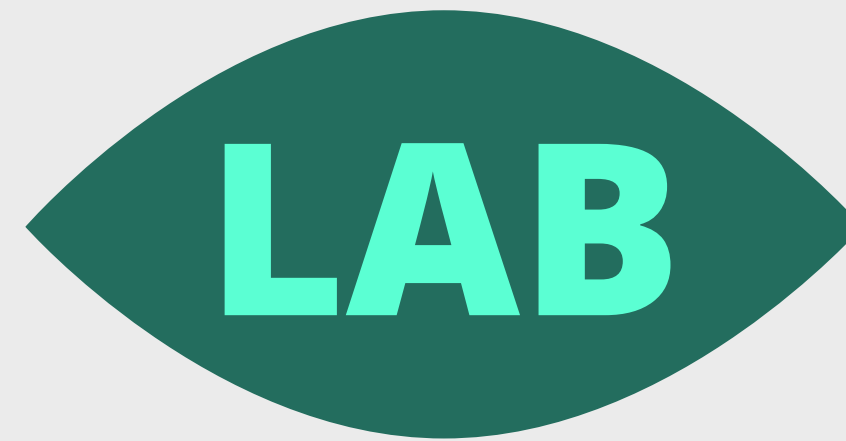
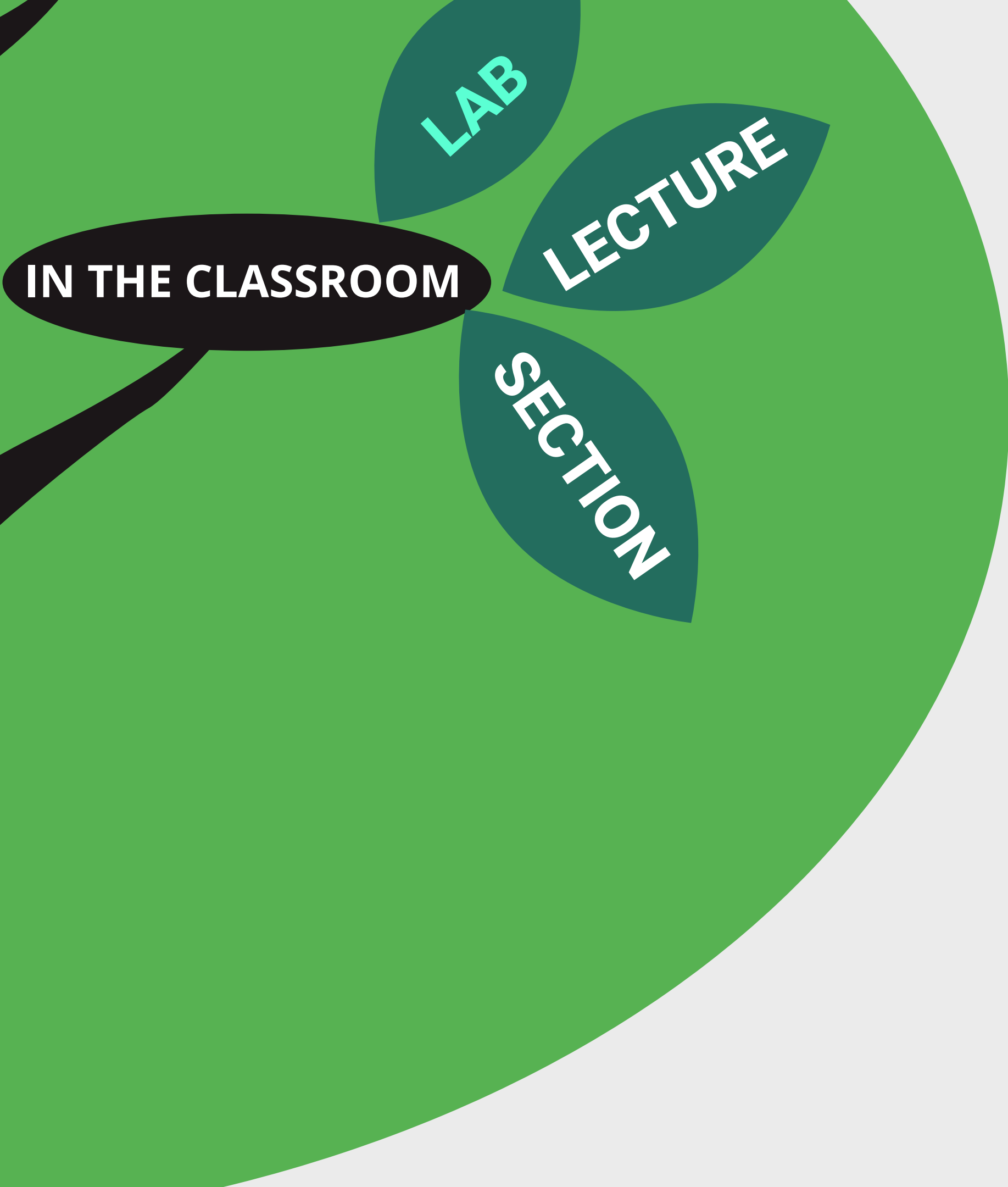
221/231: Hansen, Reutenauer, Lopez, and Bishop

Inclusive Pedagogy Strategies

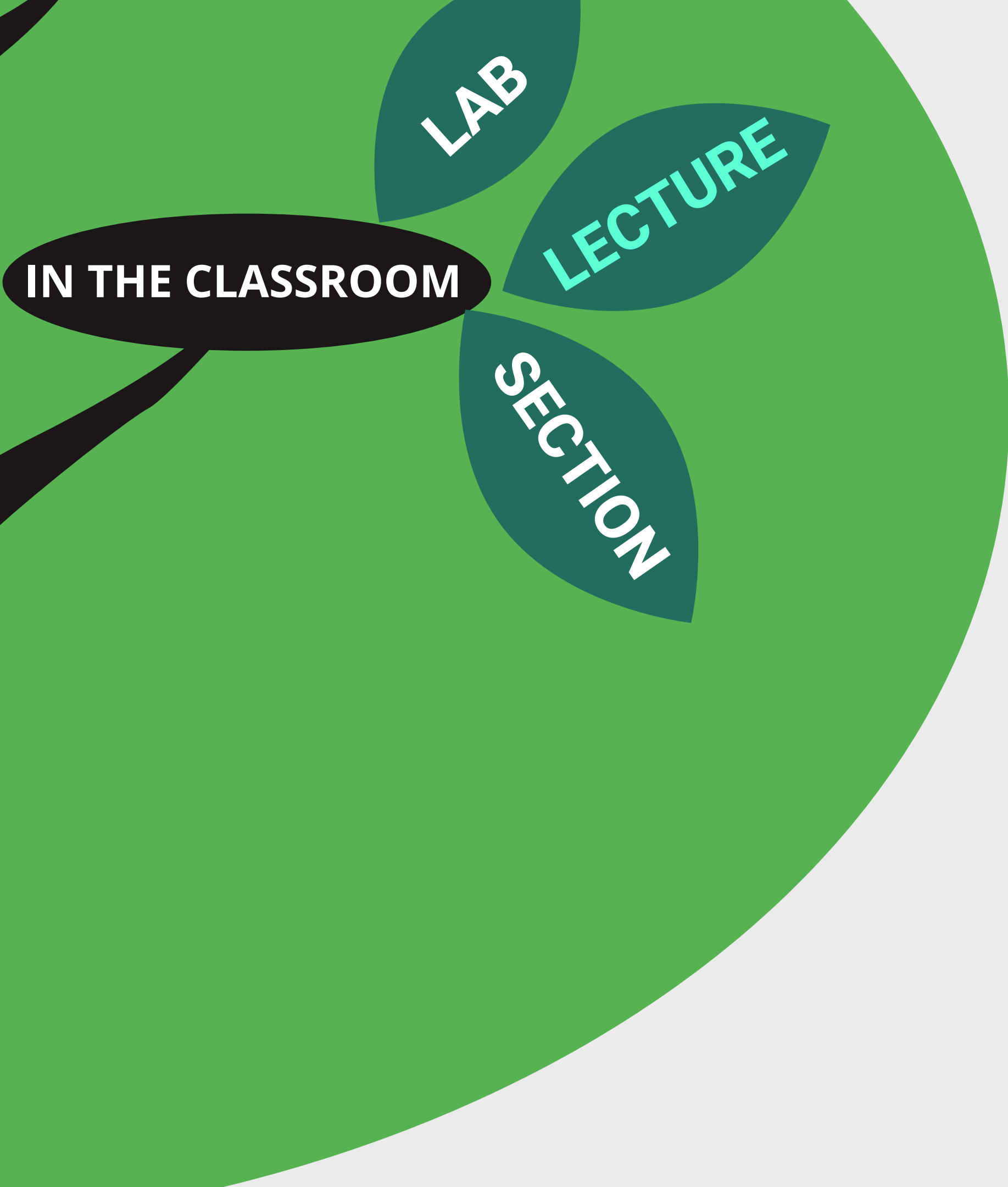


- Categorization tree
- past practices can inform and build foundation for *new strategies*





- 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

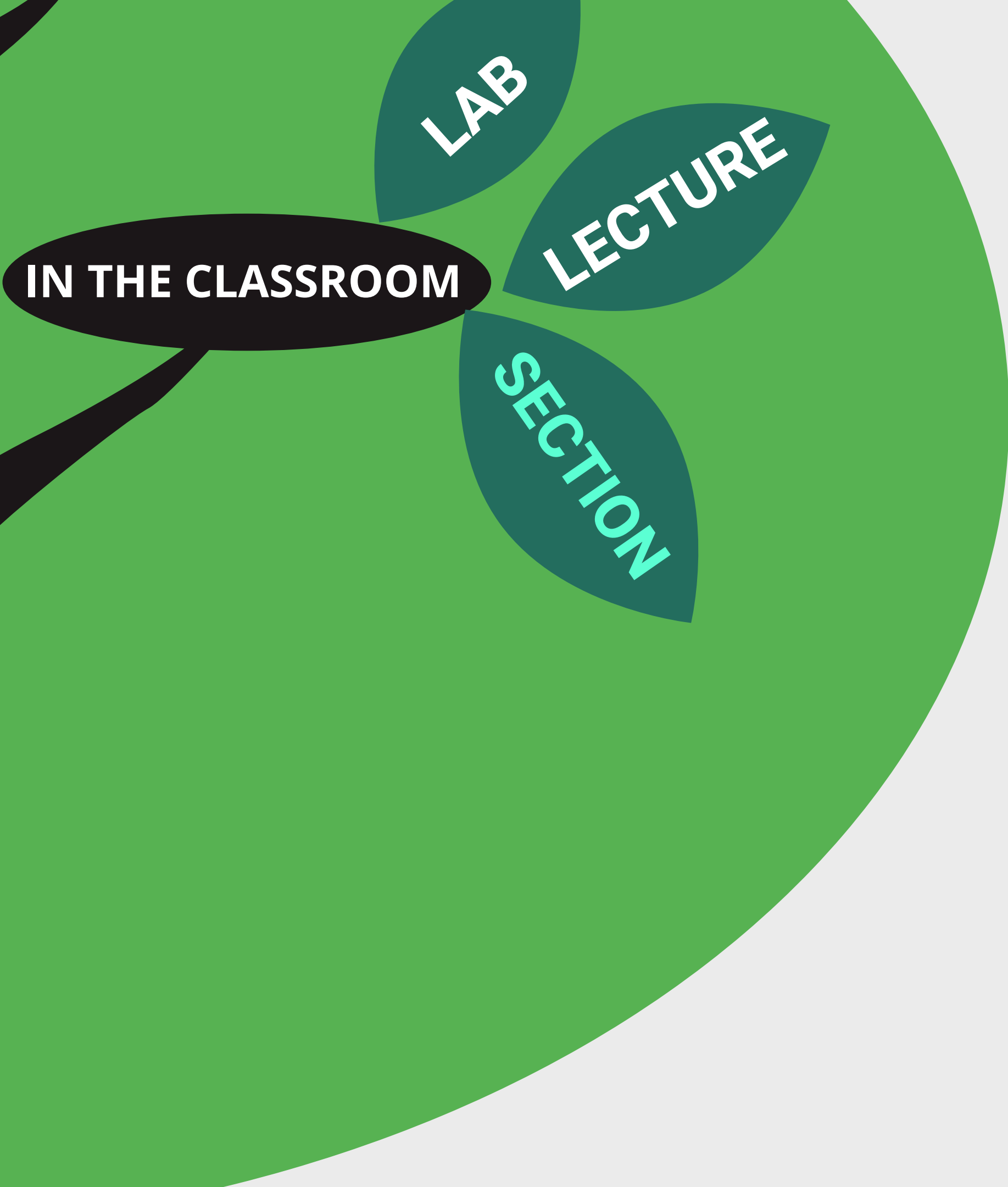
- foster **student participation** and encourage **in-class discussion**, especially in a large lecture setting

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**



SECTION

- 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

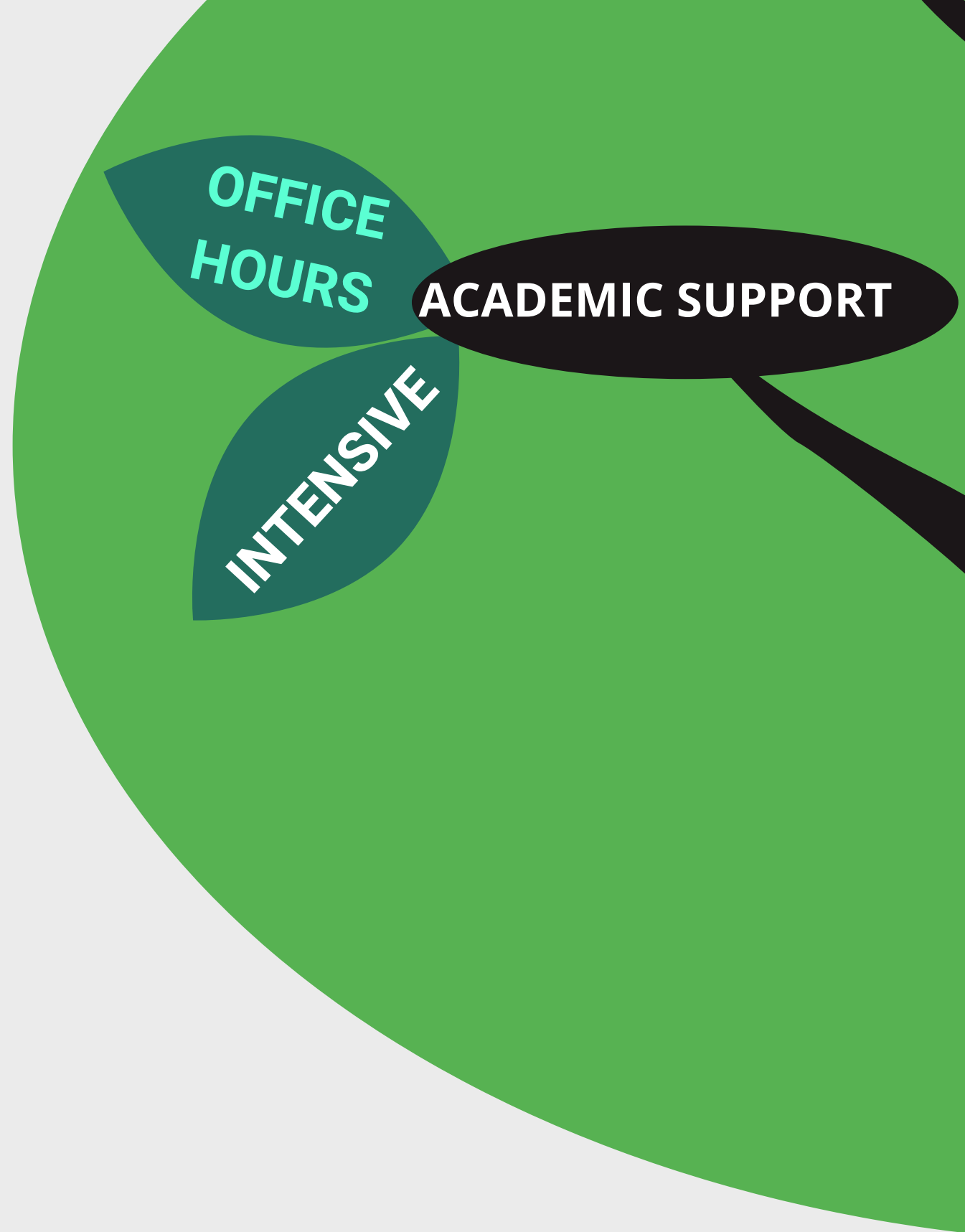
OFFICE HOURS

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**

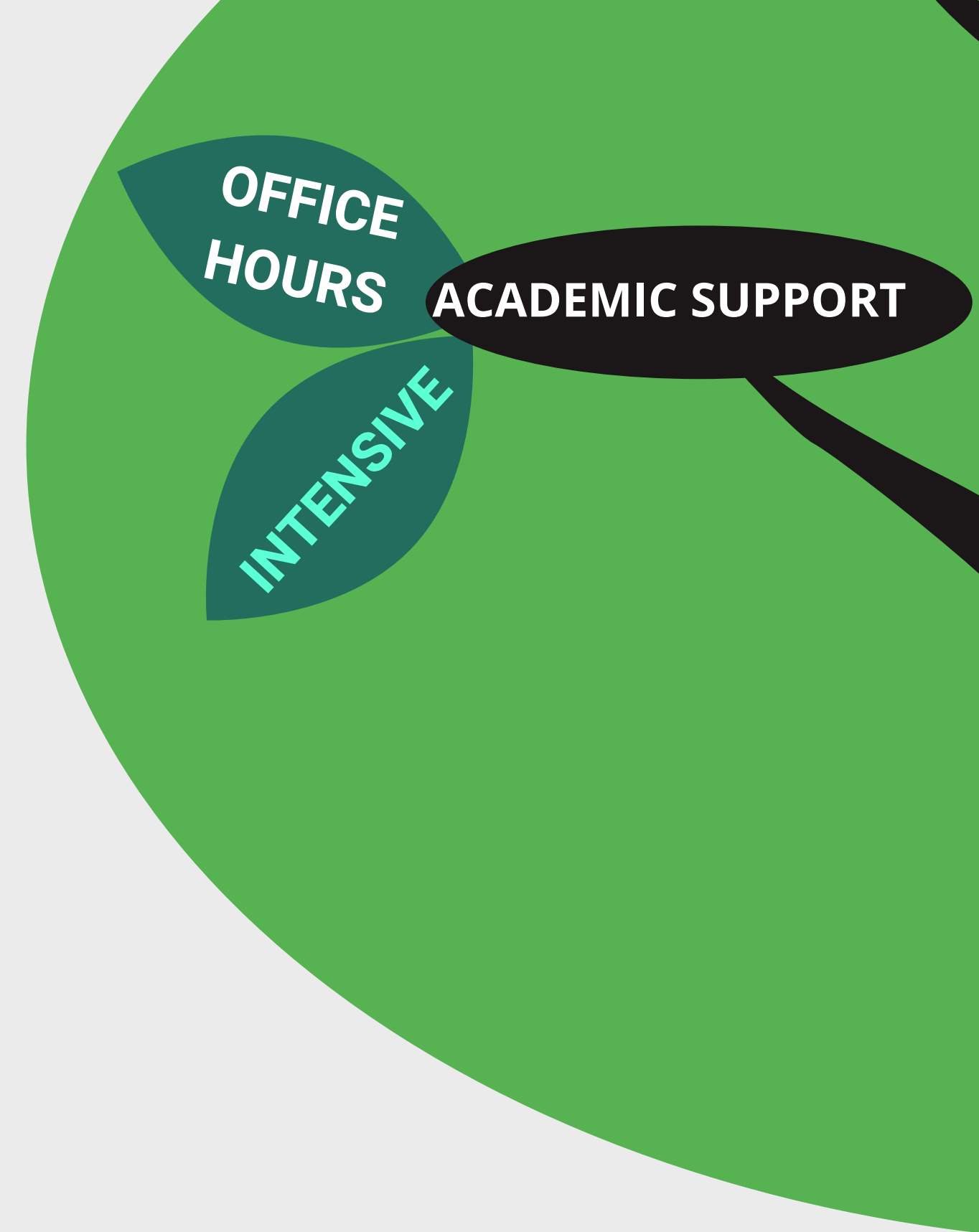
TA Drop-in hours

- TAs serve a key role as **student liasions 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**



INTENSIVE

- 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

CHEMINAR

STEM
INCUBATOR

CHEMINAR

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**



STEM INCUBATOR

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

ASSIGNMENTS + COURSE STRUCTURE

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**

ASSIGNMENTS +
COURSE STRUCTURE



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**

NEW STRATEGIES

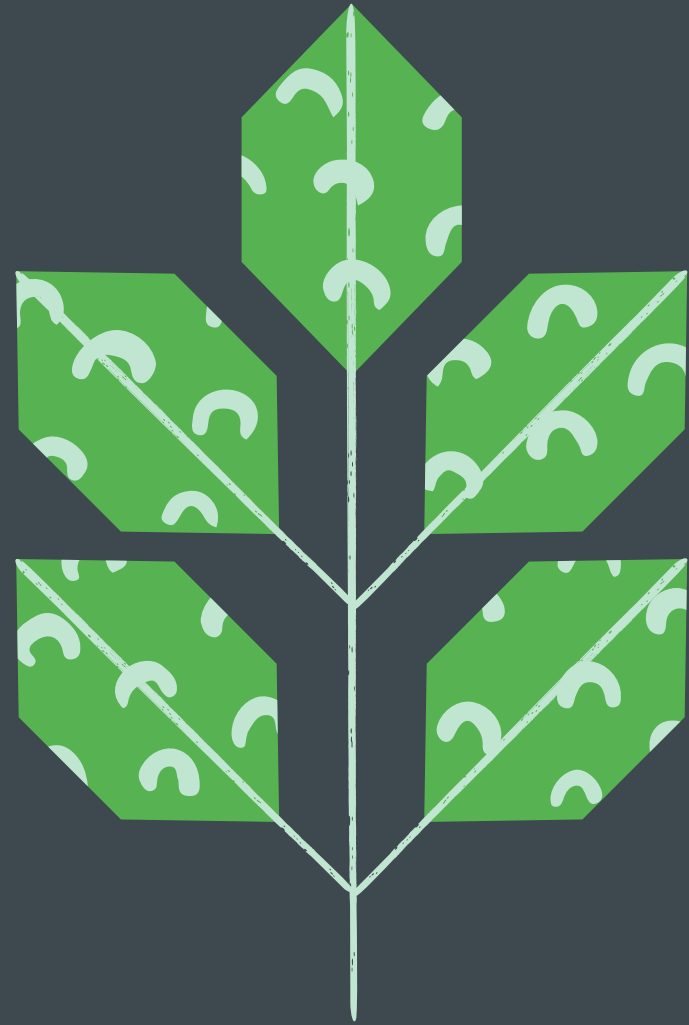
2. Maintain "low stakes" learning environments.

- 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

NEW STRATEGIES

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!