HSTEM began as a special topics course in the spring of 2016 with the goal of understanding and enhancing the STEM climate at Amherst. Building on three semesters of HSTEM student efforts, a group of faculty and staff have put together this handbook to help support faculty, especially STEM faculty, in making easy, effective and evidence-based modifications that promote inclusivity and success.
Teaching and Learning

Teaching and Learning, we would be glad to support these efforts along with the Center for Instructional Innovation, with Innovation. We encourage any interested faculty to try incorporating these practices into their courses.

Foundational STEM courses in the Fall of 2017,

committed to implementing and assessing practices from this handbook for our classrooms. So far, a few faculty members across STEM departments have experimented with new approaches to enhance the learning of every student in selected practices and drafted this handbook to support faculty and staff in building on those student efforts, a group of faculty, staff and students assembled to the unique Amherst environment.

students utilize their focus to develop pedagogy and compiling tools that would be useful for their research and initiatives the greater community of faculty and staff, HSTEM.

voice to articulate and experiences in STEM through interviews. After sharing students into the literature on inclusive practices and outcomes in STEM and giving students into the literature on inclusive practices and outcomes in STEM.

The process of creating this handbook began with the Academic Inquiry of HSTEM.

successing in STEM, while honoring their unique and shared identities.

• Foster students who see themselves and diverse others as capable of taking on diverse responsibilities for a thriving STEM community.

• Implement practices that promote engaged learning and shared courses.

• Create an inclusive learning environment that begins in the introductory courses.

The aims of the curricular initiative are to:

Start working to strengthen our STEM community.

Being Human in STEM (HSTEM) is an initiative that began in collaboration with faculty and...
Inclusive practices now or in the future?

We look forward to welcoming you to our community whether you integrate around teaching excellence at Amherst by sharing the results with the community, other during this pilot year. We hope to contribute to the ongoing conversations.

We plan to facilitate gatherings of faculty and staff to discuss and learn from each other.

Chem222, and physiology.

During 2017-2018, many students that include BIO110, BIO118, BIO191, CHEM15, CHEM222, HSTEM collaboration members will pilot course components from this handbook.

Regardless of discipline, to customize materials for your course needs, faculty, the Center for Teaching and Learning is happy to work with individual instructors to develop pilots. Handouts and slides are available in a shared dropbox.

3 performative and selective practices in Section 2. Flexible detailed instructions and overviews of the suggested practices in Section 3. Identify one or more modifications that might work for you, check out the handbook to help support faculty, especially STEM faculty, in making easy, effective improvements at Amherst by putting into action what we have learned. Building...

After 3 semesters of the HSTEM special topics course, students wanted to focus on

Join us!
<table>
<thead>
<tr>
<th>Efforts Needed</th>
<th>Can</th>
<th>Activity</th>
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| Create form | Improve | 1. Meaningful feedback, e.g., peer assessment or self-assessment, promotes learning and understanding.
| Create course | Opportunity to adjust course | Improve | 2. Regular feedback on progress helps students stay on track.
| Additional copies of papers and collect them | Show willingness to listen | Improve | 3. Feedback from peers or instructors helps students improve.
| Time to hand out the | Opportunity to read out | Improve | 4. Immediate feedback on a lecture helps students understand.
| *Creating the template* | Students engage with material | Improve | 5. Encourage synthesis and making connections to the material.
| Report back to class | Better through this activity | Improve | 6. Help students connect the dots across different course topics.
| Respond to the feedback | Research demonstrating that students | Improve | 7. Students can feel heard in a large lecture.
| Decide on changes to | *One-minute papers* | Improve | 8. Help students develop critical thinking skills.
| *Creating the template* | Immediate feedback on lecture | Improve | 9. Engage students and encourage active participation.
| *Help of T.A. if available* | *Creating the template* | Improve | 10. Help students identify with the professor.
| Collect them (can use one-minute papers and time to hand out the | *Creating the template* | Improve | 11. Positive and memorable first impression.
| *Creating the template* | *Creating the template* | Improve | 12. Encourage creativity and engagement.
| *Creating the template* | *Creating the template* | Improve | 13. Help students develop leadership and communicative skills.

I'm teaching a lecture and want to incorporate:

- Meaningful feedback, e.g., peer assessment or self-assessment, promotes learning and understanding.
- Opportunity to adjust course based on student feedback.
- Show willingness to listen to student feedback and adjust accordingly.
- Regular feedback on progress helps students stay on track.
- Immediate feedback on a lecture helps students understand.
- Encourage synthesis and making connections to the material.
- Better through this activity, research demonstrating that students engage with material.
- Students can feel heard in a large lecture.
- Help students develop critical thinking skills.
- Engage students and encourage active participation.
- Help students develop leadership and communicative skills.
1. Introduce human perspective of demography
2. Understand cultural influences
3. Explore ethical implications
4. Consider environmental impact

3.1 Goals

- Create inclusive opportunities in STEM classes that will enhance a sense of belonging for all students.
- Explicitly guide students in charting their own course for success.
- Utilize pedagogical methods that increase students' ability to see their potential as a potential mentor regardless of demographic.

3.2 Activities Overview

- First class: set expectations for developing a learning community and establishing a supportive environment that welcomes all learners.
- Mentorship: humanize the professor.
Process immediately in class.

Way to make sure you can engage with the material and start the learning.

- We all said we are committed to succeeding, this is a very easy, very effective completely new material.
- In this class, you'll be exposed to material you're familiar with as well as
- us in the classroom.

You are not prioritizing learning even sight here with the rest of

Disrupt the common learning environment by demonstrating

- Distraction including to the professor.
- On others.

(On your (will get behind, have to spend the extra time to catch up)

- In class?

Based on this exercise, what will be the impact if you are texting and surfing

Productivity-enhancing practice.

Our culture propagates the myth of "multi-tasking", as time-saving and

How many of you have tweeted/state in class?

So, what did you learn from this exercise?

Debrief

| (Write 1, then write "w" above, etc.) | I |
| Write "w", then proceed to write 1 below | I |

Second attempt:

| then, write 1-20 here | 1 |
| copy the above statement entirely | 1 |

First attempt:

Example (Write: "I want to succeed in STEM"

9. Have them estimate the difference in times, then share the times with them.

8. Have them raise their hand when they're done.

- Complete both lines.

- In other words, you write the letter "t", and then the number "t", and

then the next number in the sequence, changing from line to line.

- Give them the instruction "write a letter on one line, and then a number on

the line below, then the next letter in the sequence on the upper line, and

then the number below it, and so on, until you".

Then the letter "m" and then the number "m" and so on, until you
7. Have students share copies so you can loop back to those in the
semester to help focus their studying efforts.
6. Emphasize that you hope students will refer to these throughout the
Optional report out by groups to larger class depending on time
and discuss with a partner or group of four.
5. -minute lecture on non-graded goals for success and update your strategies
- Conclude class (especially if you are employing utility value writing and with
individually students.
4. -minute lecture on non-graded goals for success and update your strategies
"learning in the STEM fields"
..."...learning and development knowledge should be your primary goal of
learned from that class and you are a proficient/learned student where
conclude where the grade you receive from the class but you will have done what you
and of the day, you won't
grade will make sure you understand the concept of the end of the day, you won't
conclude. If you feel a grade you are not happy about, don't worry about the specific
change (we know) and if that doesn't change, you should take more challenging
that to worry about grade above the median (or even close to the median), those will
learn about achievement above the median (or even close to the median), those will
"We come to understand at one of the gap students in the class and many of us never
"We come to understand at one of the gap students in the class and many of us never

3. Pass out the handout with 10 study tips where this quote is up:

2. Minute introduction on how you will define success in this class (aside from
3 parts of skills):

1. Introduce the activities script

Specific Steps

Techniques: Promoting Practices From Cognitive and Educational Psychology

- Dunlosky et al Improving Students Learning With Effective Learning

Literature Support

- Promotes higher order thinking skills.
- Promotes critical thinking for articulating learning goals and strategies.

Goals / Rationale

Defining Success & How to Achieve It

3.2

- Want to share responsibility for the class and are part of this community
- Professor initiating this discussion will show the students that the professors
they can help your learning} sometimes value not realized until done
Feel free to ask me if you would like more understanding about how
they come up

- I will try to be explicit about why we are doing various activities as
  STEM classes, and I hope that these practices work for you
  show in research studies to improve experience and success in
  I will be introducing practices throughout the semester that have been
  our best learning and support each other in seeing our potential
  - When we will feel entitled to be here, respected, and valued, we can do

The second is that you feel supported in your goals to be successful in this
class. This should be a source of strength in this class
- We are all coming to the course from different backgrounds...
- Respect one another, help one another.
- Understanding that this allows us to learn from one another
  success for yourself, which will look different
- We do believe that you can all succeed, but that means defining
  class, unique classes, regardless of major
every one of us in this room belongs in STEM, whether it means in this
- We all belong in STEM! all of us, including the instructors, believe that
  belongs in STEM
- Stop out of learning beliefs, whether about our own success or who
  humans w/respect & curiosity across differences

The first is that we will create a real community in this classroom

As we are thinking about definitions of success for this class, I have my own
with emphasis on STEM values, possibly like this example, but in your own voice:
Set the tone and transition from the success discussion to the specific strategies

Class expectations & wrapper script

3.3.5
Can use to help structure discussion, problems and activities
  - Sometimes useful for recommendations (also material)
  - Point out examples of questions that synthesize or point forward, creative
  - Highlight different learning needs
  - For class materials, you can show good examples of material-related creative
  - Highlight common confusions in the next class
  - Highlight common confusions in the next class

For a large class, ask the TA to go through and pick out themes and/or just

How can you use these papers:

- Write a movie or song/video or a joke related to today’s material
- Provide a real-life example of what we discussed in lecture
- What explanation/example of activity was helpful from today’s class?
- What is the connection between today’s class material and past concepts?
- What is anything unclear from today’s class?

Questions about (select 2-3 of the following):
- Paper is quick and most reliable
- Can read in 1.5 of 3 per week
- Can be anonymous or non-anonymous
- Answer to 2-3 questions

After the lecture, ask students to spend one minute writing their personal

Specific steps / Examples: Link to an example

http://www.adaa.org/ accessed by

Tweed, David S. A review of the one-minute paper. (2005)

Literature Support

- Foster interaction and dialogue between professor and students
- Ask questions
- Allow all students to speak up to give more opportunity to all students to ask
- Provide feedback to both professors and students
- Have students comment on material to their lives (see utility value writing)

Goals / Rationale

3:4.1 One-minute papers

3:4.2 Activity-Specific Descriptions: Ongoing class activities
In individuals success in your course.

own feelings of success. This will reinforce the idea that you value each

4. If you have time, provide brief, but authentic feedback that echoes students' participation grades.

3. Essays can be graded for completeness by these and counted towards

be sure to explain how the information applies to you personally and

unit.

be sure to include some concise information that was covered in this

relevant to your life.

1. Select the relevant information from class notes and the textbook, and write

2. Describe something we covered during this unit that you think is really cool

adapted from University of Wisconsin

 Specific Steps: Link to an example

Integration: Distinguishing Race and Social Class

Hardest way to catch: Group achievement gaps with utility-value

Literature Support

classes at University of Wisconsin

especially of underprivileged first-generation students compared to students in biology

has been demonstrated to increase performance and retention in STEM,

to their own lives

Goals / Rationale

Utility Value Writing

3.4.2
4. For smaller classes, can arrange individual meetings

3. Can encourage students to come to office hours to discuss their results

Changing, and why,

students what you have heard, what you are changing, what you are not

2. It is critical to take a few minutes during class time to communicate to the

interpreting feedback

appropriate questions, administering the survey, and compiling and

Center for Teaching & Learning staff will assist with creating

electronically

Doing it in-class with paper is most reliable, could be done

and give feedback on the course with a focus on learning.

MID-SEMESTER, ask students to fill out a form to reflect on their own studying

Specifice Steps: [Link to an example]

(2001)


Literature Support

Responsiveness & Reactibility

Dissuades constructive incorporation of student feedback, showing

Opportunity to make adjustments to the course that benefit the student and

Give students opportunities to reflect on their own studying

Hear student feedback on course activities

Goals / Rationale

3. 4. 4 MID-SEMESTER CHECK-IN
2. When everyone has finished, tell them to throw their paper airplane around the room.

3. Ask another student to make a paper airplane, write their name on it, and two questions adapted from the directions above. Proceed as before. 

Airplane Game

4. More examples are available at the Center for Teaching and Learning.

General Introductions

1. Have each individual (inclusive of students, TAs, and instructors) say their name, quick, familiar.

2. The question can be anything you decide.

3. Name pronouns, and answer the same question.

4. Repeat until every student has participated, and you are the only one left. You are the last in line.

Choose an activity you feel comfortable doing in your class. You may also choose your own.

Support and Resources network throughout their (academic) careers. Establish a foundation for continuing relationships that can serve as a bridge between lower and upper level courses. Help them learn how to find information, how to evaluate its reliability, and how to critique it. Increase level of fun in the course to enhance students' sense of belonging by learning names to promote positive communal accountability through students.

Goals / Rationale

4.3.1 Introduction Activities

4.3 Activity-Specific Descriptions
This could be included in the lab handout or on a PowerPoint slide:

**Department-specific initiatives after the Ambitious Upswing:***

- Support the learning of every individual by meeting you where you are involved
- Implement across courses, outlined below
- Have agreed across depts on some important strategies to

**Ambitious has made a commitment to inclusivity.**

- Can have this printed on the laboratory handout
- Create an environment that values different from each other's viewpoints may be different. We expect that all class participants, faculty, staff, and students, will respect each other's culture, religion, gender, and inheritances, regardless of ability. This class will strive to be an inclusive community, learning from the many perspectives that come from having different backgrounds and beliefs.

**Class Expectations Script**

4.32
Students could relate to

- Scientific, with representation of the diversity at Amherst that held.

Creative cards for future use in development of biological molecules that will show up in the course. Brancning off with derived traits.

- Tree of life, phylogenetic tree.

- Periodic table of elements.

- Create subject-specific cards.

- Playing cards: those with same number get paired.

Playing cards is a good way to switch up groups randomly.

**Specific Examples of Group Formation**

Not: If TBL present in addition to lab, note the different goals.

- Doctors, pharmacists, etc.
- Example: doctor must communicate with nurses, patients, other.

For pre-meds, important in middle school and beyond.

- Making sure to emphasize how important this is to our class but also

- Common to need to communicate with a lot of different types of people.

- Career benefits.

- Communication.

- To have a greater understanding of the material through effective learning. Ability to explain and teach things to others, which allows

- Develop self awareness, confidence, and responsibility in the lab.

- Gain experience with different lab roles and responsibilities.

- Student Outcomes.

- To use a diversity of approaches in problem solving.

- Promote the ability to work with a variety of other people and the ability

- Build a class-wide community.

- Goals / Rationale

4.3 Group Formation
Strategize as a class ways to address these challenges.

- Highlight successful approaches from past weeks as well as common challenges.

- Beginning of the following lab period:
  
  3. As needed, the lab instructor would lead a quick reflection discussion at the beginning of the lab period.

  - What did you do well in your group this week?
  - What behaviors from your self or your partner(s) enhanced your experience with a particular lab, understanding of the material?

  - What behaviors from your self or your partner(s) enhanced your understanding of the material?

  - Examples: Initially, ask the same set of questions every time.

  - Notebook

  - Can have in Moodle, I-min paper at end of the lab, or on their own lab

  - Individual reflection at end of lab:
    
    - ex. Jump right in or plan approach for the day
    - Briefly discuss what roles in the lab, what you prefer and how you prefer to start
    - Students briefly introduce themselves

  - At the beginning of each lab, in their group:
    
    Specific steps: Link to an example

    - Enhance understanding of the material
    - Provide opportunities for students to reflect and identify behaviors that enhance group member who supports the learning of their partners
    - Create a larger community and promote awareness of what it means to be an engaged group member

- Goals / Rationale

- Reflections on Group Work

- 4. 3. 5

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