2017
Principles and Strategies for Effective Teaching

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Defining who you are as an educator and engaging in continual growth:
1. Do your best to have fun! Share your enthusiasm with your students, and savor all of the large and small moments that make teaching so enjoyable and rewarding.
2. No teaching is perfect. If you are mindful of your students' needs and dedicated to their learning and success, you will overcome the inevitable bumps in the road. You can improve and change incrementally - all good teachers do.
3. How you teach requires knowing who you are and what styles of teaching work for you. What works for one teacher, may not work for you. Find your own style.
4. Remember that you are part of a community of practice. Find mentors, observe others, seek out professional development.

Deciding What to Teach:
1. What you teach depends in part on your context and constraints. Think about what those are.
2. What you teach depends in part on who your students are. Think about what their prior experiences and future needs are. Think about the impact of their heritage and culture on the learning.
3. Do your best to design your whole course and individual lessons around a set of clear learning objectives, which should clearly detail what you want your students to know and do, and how you would like them to demonstrate their learning. Share your learning outcomes with your learners.

Advice about Mindful Teaching

Developing a learning community:
1. Each learning community has a set of values and norms that impact the effectiveness of the environment for learning.
2. A positive classroom culture is most likely going to be attained if you are thoughtful about the culture you want to create and take specific actions to foster that culture. Be sure to outline your expectations and start developing your preferred classroom culture on day one.
3. Listen to your students and be open to (reasonable) changes in your class if it will better suit your students' needs while still meeting your learning objectives.
4. A student's heritage and culture can play a tremendous role in their education and their other experiences. Be mindful of the impact of culture on your students, but at the same time do not overgeneralize about specific groups - get to know student specifics, if possible.

Deciding How to Teach:
1. Learners are diverse in many ways. There are universal design strategies and specific strategies to promote learning by ALL.
2. Loads of research shows that learner-centered instruction is more effective, yet most college educators are accustomed to lecturing. Break the cycle. “Active learning” is easier (and harder) than you might think.
3. Mankind has been thinking about teaching and learning since the days of Plato. There is a wealth of literature about how people learn. Explore some of that literature.
4. Pedagogical content knowledge includes understanding common difficulties that students encounter when learning particular content and understanding specific teaching strategies that can be used.
5. Alignment is critically important. Align your teaching with your learning objectives and assessments.
6. Design meaningful summative assessments that measure student achievement of your learning objectives and formative assessments that inform both you and your students' understanding of their progress.
Introduction to the Course

Learning Objectives
1. Describe your core values and philosophy about teaching and the habits you want to practice as an educator.
2. Describe the attributes of a positive classroom culture and a variety of actions you could take to foster the development of a positive classroom culture for diverse learners.
3. Explain the value of research-based and principle-based teaching.
4. Describe and practice using the elements and applications of backward design.
5. Begin to develop a toolbox of teaching practices and techniques that are aligned with you your own teaching philosophies and backward design.

Practical Products
1. You will create a statement of your own principles and values about teaching and learning that will serve as a basis for a draft teaching philosophy.
2. You will create and deliver a mini-lesson that will provide you with the opportunity to practice backward design and get feedback about various elements of teaching.
3. As a class, we will develop a toolbox of readings and teaching techniques that you can use in your current or future teaching.

Guiding Principles and Values for This Course
- Transparent
- Participatory
- Student-Centered
- Organized
- Transformative
- Grounded in empirical evidence and/or principle
## Course Schedule: 5:00-7:30

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Pre- Assignment Reading and Reflection</th>
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<tbody>
<tr>
<td>1- Feb 8</td>
<td>Culture, principles, Values</td>
<td>Read these before the session. <strong>Introspection Exercise, Role of Grace in Teaching, Taking My Parents to College</strong></td>
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</tbody>
</table>
Skim the description of the “Teachable Tidbit.”  
Read/explore at least one of the following resources until you get a sense of what a teaching philosophy is and how you might (or did) go about writing one.  
- [Ohio State Teaching Portfolio Site](http://www.youtube.com/watch?v=JeKWxInKTck)  
- [UC-Santa Barbara. This has links to a rubric and a great article.](http://www.youtube.com/watch?v=JeKWxInKTck)  
- [University of Michigan Center For Teaching and Learning.](http://www.youtube.com/watch?v=JeKWxInKTck)  
- [UTEP - Writing a Teaching Philosophy.](http://www.youtube.com/watch?v=JeKWxInKTck)  
- [Chronicle – 2003.](http://www.youtube.com/watch?v=JeKWxInKTck)  
Watch as much as you can stand—but at least the first 30:32—of the following: Handelsman, M. M. (2011b, February). Teaching philosophies. Invited workshop presented at the University of Texas at San Antonio. Available at [http://www.youtube.com/watch?v=JeKWxInKTck](http://www.youtube.com/watch?v=JeKWxInKTck). |
21 Strategies to Promote Classroom Equity  
How to Ask the Right Questions**                                                                                                                                 |
| 4- March 1| Instruction                                 | Read these before the session. **Millis – Collaborative Learning  
Redish – Implications of Cognitive Studies**                                                                                                                                 |
| March 8  | Teachable Tidbit                           | None                                                                                                                                                                   |
| March 15 | Teaching Philosophy                        | Peer Teaching Philosophies                                                                                                                                              |
The Teachable Tidbit

As a way of integrating what you are learning in the course, you will create a mini-lesson either alone or in pairs. You will write a lesson plan using the format we have been using for this workshop and you will deliver your lesson during the fifth session. It is okay to take risks. Think of this as a workshop rather than a performance.

How long should my “teachable tidbit be?”
15 minutes or less

What should it be about?
It can be about anything you want as long as it is accessible to all participants - a concept from your area of research, a hobby or something you’re passionate about, a teaching technique, etc. Really, just about anything goes! Your target audience should be non-expert adults with an interest in the sciences, roughly at the level of a sophomore undergraduate. You should use a teaching technique either from the list we have provided or you can find another technique. You should also pick one or more of your principles/values and be intentional about imparting that in your lesson.

What should be in my lesson plan?
You can use the lesson plan template we provide. The lesson plan should show evidence of backward design and include: objectives, assessment, and activities. You will have an opportunity to “workshop” your objectives, assessments and activities in weeks 2-4 of the course.

What will I get from doing this?
You will get first-hand experience of implementing backward design and creating a lesson plan. You will integrate all that you have learned in the workshop. You can think of this as the capstone experience for the workshop. You will get feedback from student and facilitators about your lesson plan and your teaching style.

Hints, Tips and Helpful Suggestions
1. Think about the broader aspects of classroom culture you want to be part of your teaching. Try to infuse them into your tidbit!
2. Use powerpoint only if you have a good reason.
3. Employ student-centered instruction - incorporate at least one active learning technique that appears in our course glossary.
4. We hope that you get to know each other as the workshop goes on. Think about how you can make your tidbit come alive for your (soon to be familiar) audience.
TEACHABLE TIDBIT - LESSON PLAN TEMPLATE

Topic area or subject matter

Learning Objectives

How will you assess whether students meet the learning objectives (questionnaires, activities, etc.)?

Describe the activities of the lesson (What will you do? What will students do? How does an activity inform assessment?).

What is something you would particularly like feedback about.
Session 1: Classroom Culture & Statements of Principles and Values

PRE-READING & REFLECTION ASSIGNMENT

1. **Introspection Exercise:**
   a. Take this seriously, because it will lay a great foundation for the course and your participation.
   b. Record the responses in writing. If you do this digitally, print out a hard copy to have for class discussion.

2. Read “Role of Grace in Teaching” and “Taking my Parents to College”

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LEARNING OBJECTIVES/SWBAT FOR THIS WEEK

1. Get to know each other, discuss why you are in the workshop, and share goals for the workshop.
2. Reflect on your experiences of teaching and learning.
3. Articulate your major principles and values as teachers, as a way to begin developing a teaching philosophy.
4. Identify aspects of classroom culture that are effective for a spectrum of students in a variety of settings. Utilize this to craft an idealized classroom culture for the LHTT workshop.

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DO NOW (this is a way to get people learning and doing from the moment they walk in)
Fill out the pre-assessment.

COMMUNITY BUILDING (5:15)

Quick introductions and your motivation for being here. What was your general response to the Introspection Exercise, Modules 1 and 2? What struck you as you reflected and wrote?

DISCUSSION/ACTIVITIES: Culture and Philosophy (5:30)

Note - We have more activities than we can actually do. This gives us flexibility to follow the needs of students.

Activity 1 (Think-Pair-Square) - Our Goals, Values, and Principles

1. In pairs:
   b. Come up with 2 GENERAL goals for teaching, 2 values, and 2 principles that you’d like to share

2. Each pair pair up with another pair. In your group of four:
   a. Share your goals, values, and principles
1. Discussion:
   
   a. Generate something you’d like to share with the entire group, about consensus values or principles, how the group functioned, areas of disagreement, what you wish you could have done, etc.
   
   b. Each person should be prepared to report to the big group

3. Reporting out:
   
   a. Facilitator will randomly choose one person from each group to report
   
   b. Report what the group found, and, if you want, one personal reaction
   
   c. Whole-group discussion

4. Course Preview (can be done as think-pair-share with faculty and students) (if time allows)
   
   a. Explain the structure of your course and what is upcoming.
   
   b. In pairs: Three goals, principles, for your role in this workshop
   
   c. Report out
   
   d. Faculty share our major goals, principles

Activity 2: What is (Effective) Classroom Culture? (6:15 - Dinner Activity)

1. Collectively: Define classroom culture

2. Group brainstorm a list of actions that could foster positive classroom culture.

Activity 3: Discuss how students will experience classrooms (and even schooling) differently. (6:30)

1. Discuss case of “Taking My Parents to College”.

2. Discuss “Active Learning” Case Study (see below From Scientific Teaching by Handelsman et al.)

3. Discuss “The Role of Grace in Teaching”
   
   a. How does the overarching message of this article mesh with the desire to maintain high standards and rigorous expectations for student effort and learning?
   
   b. What would the impact of an increased “grace mindset” be? For undergraduates? Graduate students?

4. Hand out a paper to each student with a trait (e.g., lactating mother, veteran with TBI, ELL, mother is a professor) written on it. Discuss how having this trait might affect your learning or how you experience a course? Discuss CU Denver Demographics (or demographics at your own institution).

REFLECTIONS ABOUT PROCESS (7:15)

Process Discussant will recap the learning objectives and lead a reflection about the teaching processes used including Do Now, Think-Pair-Square, Group Brainstorm, and Case Studies/Scenarios. Process Discussant will address any questions or concerns that came up during the session.

LOOKING FORWARD (7:20)

Short Term: Next Week - Teaching Philosophy Drafts (?)

1. Discussion: How shall we turn these discussions into your teaching philosophies?
Mid-Term: The Teachable Tidbit
Long-Term: Your Future as an Educator

EVALUATION (7:25)


Professor:
“I use ‘active learning’ all the time in my class. Every minute or two, I ask questions. I think it makes me seem friendly and open to hearing the students’ ideas. I try to call on students randomly to make sure everyone is engaged, but often I end up asking the bright students because they set the standard for the rest of the class.”

Student #1
“The professor is so engaging in this class. I feel like I have a connection with him, and want to come prepared to class every lecture so I can answer the questions he asks. Sometimes, he asks a question and I answer it, and then we have a great dialogue in front of the whole class about something way more advanced than what is in the syllabus. I am learning so much!”

Student #2
“This class scares me to death. The professor asks questions every few minutes, and I am so afraid that he will ask me something I don’t know the answer to. I have to sit toward the front because my hearing is poor, but I try to sit on the far right side of the room out of his line of sight so I can avoid eye contact. I can’t wait until the semester is over so my anxiety can decrease.”

Student #3
“I have no clue what is going on in this class. The prof constantly asks questions, but I usually have no idea what the answer is. I must be really stupid because the students in the front seem to know all of this already. Anyway, the prof ends up calling on them over and over. I either hide in the back so he won’t call on me or skip lecture altogether. I wish he would just tell us what he wants us to know.”

- What issues might be contributing to the differing opinions about the classroom experience?
- How does the professor define ‘active learning’?
- Which of the three students do you most closely associate with?
- If this was your course, what would you do if you were given these student comments as feedback?
- What assumptions or biases do you have about the professor or student?
Session 2: Introduction to Backward Design & Continuing Work on Teaching Philosophies

PRE-READING & REFLECTION ASSIGNMENT
2. Skim the description of the “Teachable Tidbit.”
3. Bring your introspection exercise with you to this session.
4. Read/explore at least one of the following resources until you get a sense of what a teaching philosophy is and how you might (or did) go about writing one.
   a. Ohio State Teaching Portfolio Site. Part of a wonderful site about Teaching Portfolios, links to award-winning philosophies written by graduate students.
   b. UC-Santa Barbara. This has links to a rubric and a great article.
   c. University of Michigan Center For Teaching and Learning. This site has a rubric, articles, examples, and a link back to Ohio State!
   d. UTEP - Writing a Teaching Philosophy.
5. Watch as much as you can stand—but at least the first 30:32—of the following: Handelsman, M. M. (2011b, February). Teaching philosophies. Invited workshop presented at the University of Texas at San Antonio. Available at http://www.youtube.com/watch?v=JeKWxInKTck.

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LEARNING OBJECTIVES/SWBAT
1. Begin developing a “teaching tidbit” - a short 15-30 minutes that includes testable, specific learning outcomes, assessments aligned to the learning outcomes, and activities aligned to the outcomes.
2. Identify the critical elements of backward design and explain the importance of alignment among the elements.
3. Describe what makes a worthy and clear learning objective.
4. Begin to develop your teaching philosophy.

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RECAP FROM LAST WEEK (5:05)
1. What were the big ideas from last week?
2. So what? How did our activities and readings from last week impact how you think about yourself as a learner? As a teacher?
3. Any questions or further thoughts?
DISCUSSION OF TEACHING PHILOSOPHIES (5:10)

Development of Teaching Philosophy
1. What struck you about the reading and viewing you did related to teaching philosophies?
2. What purposes might the teaching philosophy serve for you?
   a. Statement of philosophy vs. statement of accomplishments
   b. Accomplishments are examples.
3. Who is your audience (for now)?
4. What are the elements that could be in your teaching philosophy?
   a. Goals, values, principles, strategies, techniques, behaviors
   b. Stories, metaphors, themes

DISCUSSION OF BACKWARD DESIGN AND LEARNING OBJECTIVES (5:45)

Elaboration about Backward Design (5:45)
1. How is backward design related to conducting scientific research?
2. What would be evidence of alignment or misalignment among objectives, assessments and activities? Describe instance in which alignment was good or not so good. What was the effect on you as a learner?

Dinner - Share and modify your teachable tidbit ideas over dinner. (6:00)

Diving into Learning Objectives (6:20)
1. Motivation to develop LOs. How many of you have been in a course in which the instructor says, “You are responsible for everything covered in lectures. Of course, you should concentrate on the important things.”? What assumptions are being made? Credit to JJ Cohen MD,PhD, Department of Immunology and Microbiology, University of Colorado Denver School of Medicine (6:20)
2. Activity - Use the worksheet of LOs and critique them. [Create a worksheet for participants that includes of sample LOs ranging in quality. Take some LOs from this workshop and take some LOs from courses in disciplines of your participants.]
   a. What are students going to do?
   b. Under what conditions are they going to do it?
   c. How are you going to know if they did it well?
3. Discuss the context in which an instructor creates LOs. How does your own philosophy, guiding documents in your field, institutional goals, and departmental structure inform your decisions?
4. In groups of three, work on the teachable tidbit assignment. Come up with a list of what would make a good tidbit and give each other feedback about your tidbit ideas. Talk about how you will integrate your philosophy into your teachable tidbit time. Start formulating the learning objective(s) and get feedback.
REFLECTIONS ABOUT PROCESS (7:15)
Discussant will lead a reflection about teaching processes used.

LOOKING FORWARD (7:20)
Short Term: Next Week - We will discuss assessment.
Mid-Term: Your Teachable Tidbit and Your Teaching Philosophy
Long-Term: Your Future as an Educator

EVALUATION (7:25)
Session 3: Assessment

PRE-READING & REFLECTION ASSIGNMENT

LEARNING OBJECTIVES/SWBAT FOR THIS WEEK
1. Compare and contrast formative and summative assessment.
2. Describe the characteristics of good assessments.
3. Describe how to ask different questions for different purposes.
4. Explain the benefits of regular, ongoing assessment.

Do Now (5:00)
1. We have listed all 21 strategies from the article on a poster paper. Select the three that you think have the largest impact on effective formative assessment.

RECAP FROM LAST WEEK (5:05)
1. What were the big ideas from last week?
2. So what? What influence will our activities and readings from last week have on you as a learner? As a teacher?
3. Any questions or further thoughts?

PLANNING FOR TEACHING PHILOSOPHY DISCUSSION(5:10)
Participants will negotiate how they want to share their teaching philosophies with each other to get peer feedback (i.e., share on google drive by X date and put feedback in the drive by X date).

DISCUSSION/ACTIVITIES: ASSESSMENT

Activity 1 (5:20): Discuss “Twenty-One Teaching Strategies” in the context of assessment using Classroom Voting Technique

1. With a partner, discuss whether you feel that the categories receiving the most votes do or do not have an impact on effective assessment. Why or why not?
2. The title of the article states that the 21 strategies also “Promote Student Engagement and Cultivate Classroom Equity”. Along these lines, how might consideration of equity impact your approach to your selection and implementation of formative or summative assessments?
3. What strategies might you use in your teachable tidbit?
4. What is the relationship between assessment and active learning?
Activity 2: Practice with Questions (5:55 - Dinner Activity)

http://www.colorado.edu/sei/fac-resources/workshops-clickers.htm

Give each group of 3 students a die. Ask them to consider a story or movie they all are familiar with (fairy tale, recent blockbuster movie, classic movie) and have the students in each group take turns rolling the die. The number each student gets will determine the Bloom level of question that they will ask about the story (1=Knowledge, 2=Comprehension, 3=Application,...). Use a group report out protocol to identify best or favorite questions. Ask the value of each type of question and whether students found certain types more difficult to design questions around.

Activity 3 (Whole Group): Demonstrates the anatomy of peer instruction and why it is important for assessment to tell you what students know (rather than what they don't). (6:30)

1. Students will be given or create a paper that can be folded into four sections with A, B, C, and D on each section. This will be their “clicker”. Give a clicker question to model
the peer instruction technique. [We used the question below from Anderson et al., but you can use another question.]

2. Discuss the answer choices and what each one tells you about what the student knows and thinks.

3. Discuss what good peer instruction looks like and ways to keep peer instruction from going wrong. This website has lots of great resources - http://www.colorado.edu/sei/fac-resources/workshops-clickers.htm

4. Discuss what conceptual assessments are and how to use them to inform instruction.


In guppy populations, what are the primary changes that occur gradually over time?
   A. The traits of each individual guppy within a population gradually change.
   B. The proportions of guppies having different traits within a population change.
   C. Successful behaviors learned by certain guppies are passed to offspring.
   D. Mutations occur to meet the needs of the guppies as the environment changes.

Activity 4 (optional - may cut if we run out of time): Discuss The Case of the Frustrated Student Using Case Study Technique (6:55) (Think; whip-around, group discussion)


I am a junior majoring in biology. I was thinking I might go to graduate school to do research and become a professor, or maybe apply to medical school. I usually get A’s in my courses; only a few B’s so far in college. I totally breezed through high school; it was so easy.

This semester, I enrolled in introductory microbiology. I approach this class like most others: I attend lecture (have only missed two this semester!), read the textbook (usually before class, if I have time), and turn in the homework if it’s going to be graded. Prof. Lopez is great; he’s really well organized and follows the book closely. The homework has been helpful for learning the terms and information.

The first midterm exam in this course was NOT what I expected. None of the questions were multiple choice. We had to write out short (and sometimes LONG) answers. I barely finished it in the 2-hour exam period. Plus, three of the questions tested us on things we never learned and skipped the stuff we had covered in class. For example, we learned about the lac operon last week, and it wasn’t even on the test. But there was a question asking us to “describe a strategy that bacteria use to regulate gene expression and explain why such a strategy might provide a selective advantage.” How am I supposed to know about that? I got a 72% on that test. What a crock! Forget Microbiology; it’s not for me.

1. What issues might be contributing to this situation?
2. Do the assessments give the students any feedback about what they understand while they are learning about this topic?
3. What do the assessments motivate students to learn? What effect do you think this professor’s assessment will have on student behavior for the next test? Do you think that was the intention?
4. What suggestions do you have for the professor?

REFLECTIONS ABOUT PROCESS (7:15)
Process Discussant will lead a reflection about teaching processes used,

LOOKING FORWARD (leave last 5 minutes for this)(7:20)
Short Term: Next Week
Mid-Term: The Teachable Tidbit
Long-Term: Your Future as an Educator

EVALUATION (7:25)
Session 4: Instruction

PRE-READING & REFLECTION ASSIGNMENT
1. Read the “Millis – Collaborative Learning” article and be prepared to apply some of the principles in there to specific techniques, which you will (a) read about and teach in class, and (b) potentially use in your teaching tidbit.
2. Read the “Redish” article, which we may or may not get a chance to discuss in class. But come with a point or two that strikes you.
3. By class time: Submit to the Google drive your draft teaching philosophy in a Word file titled “YOURNAME—teaching philosophy draft—March 1, 2017.”

LEARNING OBJECTIVES/SWBAT
Mental Models
1. Explain what a mental model is and how mental models are constructed and changed over time.
2. Describe how active learning can help change a student's mental model of a particular concept.

Active Learning
1. Explain why active learning approaches are more effective than passive learning approaches.
2. Describe some of the many and varied active learning approaches
3. Apply some principles of active (cooperative) learning to those approaches
4. Choose an active learning strategy that would be appropriate for a set of sample learning objectives (i.e., your tidbit) and a particular classroom culture (i.e., this class).

RECAP FROM LAST WEEK (5:00)
1. What were the big ideas from last week?
2. So what? What influence will our activities and readings from last week have on you as a learner? As a teacher?
3. Any questions or further thoughts?

COMMUNITY BUILDING (5:10)
Share with a neighbor something you used to think, but that now seems silly to you.
Describe how your mental model of the “thing” changed.

ACTIVITIES
Activity 1: Mental Models (5:15 - Dinner during the movie or toward the end)
1. Watch “Lessons from Thin Air” and discuss how it illustrates the idea that mental models are built over a long period of time and changing mental models is not always easy.
2. As a class, discuss why active learning is more powerful for shaping mental models than is passive lecture.
Activity 2: Active Learning *(6:15)*

1. Jigsaw activity to learn some active learning teaching techniques.
2. Individual time to think (and ask) about activities for your teachable tidbit.


<table>
<thead>
<tr>
<th>Passive Lecture</th>
<th>Active Lecture</th>
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</thead>
<tbody>
<tr>
<td>Every cell in an organism has the same DNA, but different genes are expressed at different times and under various conditions. This is called gene expression.</td>
<td></td>
</tr>
<tr>
<td>Different parts of your body can do different things. For example, your hand has fine motor skills and your leg does not. This is due to the presence of different motor units.</td>
<td></td>
</tr>
<tr>
<td>Evolution requires preexisting variation in a population, selective pressure, and reproduction. It happens at the population level.</td>
<td></td>
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<tr>
<td>Many people have concerns about climate change, but people don’t understand it because they don’t understand the carbon cycle, the idea that small events can come together to have larger impacts, or the concept of deep time.</td>
<td></td>
</tr>
<tr>
<td>Based on the data shown in this slide, researchers concluded that <em>Snarticus</em></td>
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inferensis is an invasive species.

REFLECTIONS ABOUT PROCESS (7:15)
Process Discussant will lead a reflection about teaching processes used,

LOOKING FORWARD (7:20)
Short Term: Next two weeks and the Teachable Tidbits
Long-Term: Your Future as an Educator
Teaching Philosophy and Teachable Tidbit - Planning
  1. Discuss how we will give feedback for Teaching Philosophies. Mike will explain the peer review structure.
  2. Go over Teachable Tidbit presentation expectations and timeline. Sign up for a date for presenting.

EVALUATION (7:25)
Session 5: Teachable Tidbits

LEARNING OBJECTIVES/SWBAT

1. Teach a mini-lesson using backward design that is appropriate for the audience and includes learning objectives, assessment, and active learning
2. Write a short metacognitive reflection about what you want to improve about your teaching?

RECAP FROM LAST WEEK (5:00)

1. What were the big ideas from last week?
2. So what? What influence will our activities and readings from last week have on you as a learner? As a teacher?
3. Any questions or further thoughts?

ACTIVITIES

Teachable Tidbit Time (groups of 4 participants)
Each person will have 10-15 minutes to deliver their teachable tidbit followed by 10-15 of constructive feedback per person.

REFLECTIONS ABOUT PROCESS (7:15)
Process Discussant will lead a reflection about teaching processes used,

LOOKING FORWARD (7:20)
Short Term: Next week - Teaching Philosophy Workshop
Long-Term: Your Future as an Educator

EVALUATION (7:25)
Session 6: Teaching Philosophy

PRE-ASSIGNMENT
Read the teaching philosophies of the two other members of your group, and prepare to provide feedback.

LEARNING OBJECTIVES/SWBAT
1. Develop plan to revise teaching philosophy draft based on feedback
2. Provide feedback to colleagues about their teaching philosophies

RECAP FROM LAST WEEK (5:00)
What did you learn from doing, watching, and providing feedback for, teachable tidbits?

ACTIVITIES
Teaching Philosophy Workshop (5:15 - Dinner somewhere during this session)
In groups of 3, participants will provide feedback to one another with the aim of improving the teaching philosophy statement.

Big group discussion of philosophies

Reflections about the course (6:30)
Explore questions such as:
● What worked for you? What didn’t?
● If we had another week (or 6), what would you want to do, cover, study?
● What is your next step in your development

REFLECTIONS ABOUT PROCESS (7:10)
Process Discussant will lead a reflection about teaching processes used,

LOOKING FORWARD (7:15)
Long-Term: Your Future as an Educator

EVALUATION (7:20)
ACTIVE LEARNING TECHNIQUES

5-3-1 - http://www.theteachertoolkit.com/index.php/tool/5-3-1

1. Alone
Pose a question or topic related to the lesson that has many possible responses. Then have students individually brainstorm five possible answers or things they know about the topic.

2. Pair
Ask students to work in pairs to come up to share their lists and then decide on the three best answers or ideas from their two lists.

3. Group
Instruct the pair to join with another pair to choose the one response they think is best or most significant.

Brainstorming
Students are asked to create a list of terms or ideas with a moderator collecting the list in a location visible to others. May take place in a large class setting or in smaller groups. (Handelsman, Miller, & Pfund, 2007)

Case Study - Here are some great resources for teaching science using case studies.

Concept Cartoons

Concept cartoons are single-panel images showing several characters explaining a situation. One of the characters provides a scientifically accurate answer, and the others make statements that are incorrect, but often typically include common student ideas. The first science concept cartoons were created by Stuart Naylor and Brenda Keogh in the late 1990’s for use in teaching physics. Kathleen Fisher and Dianne Anderson created biology concept cartoons related to natural selection in 2002. Since then, the collection has grown, and in 2014, artwork was redone and brand new cartoons on various biology topics were added.

Teachers can use concept cartoons to probe the ideas held by students, and then can adjust instruction to help to move students to scientific understanding. Concept cartoons are used by teachers as warm-up activities, as starters for small group discussions, or even as homework to do with family members. One particularly effective in-class method is to provide each individual student with a copy of the cartoon, and ask them to indicate the answer they feel is the best, as well as to explain (in writing) why the other answers are not. Then the small group comes to a consensus and students make a note if they change their answer, and finally the whole class discusses the cartoon and comes to a decision as to the best answer.
You can also ask students to create cartoons to explain a concept or even illustrate the methods of an experiment.

Concept Mapping

Activity where students identify key terms or concepts, create a meaningful pattern, and then use directional arrows explain relationships between the terms. (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010; Handelsman, Miller, & Pfund, 2007)


1. Prepare Chart
Determine the degree of measurement (numerical or value-based). Draw a chart with large, empty columns, or use one of the templates provided. Place the numerical value or value-based statement at the bottom of each column. Display the chart for students to see.

2. Gather the Data
State the objective that is being assessed or ask a question. Have each student go to the chart and place a sticker or mark above the number or statement that he/she agrees with.

3. Analyze the Data
Allow time for students to review the data on the chart, and ask them for ideas about the meaning of the data.

C.R.E.A.T.E.

A structured reading approach where students do a close reading of a scientific article and are asked step-by-step to Consider, Read, Elucidate hypotheses, Analyze and interpret the data, and Think of the next Experiment using concept maps, writing, and discussion. (Hoskins, 2010)
**Figure Analysis Template**

This teaches students to Actively engage with data • Determine the significance of each figure in a paper • Determine the logic of each experiment in a paper • Define controls and determine their role • Relate data presented to results derived • Debate the significance of the data, defend their own ideas, and intelligently criticize the authors' interpretations

1) “Official” title for this figure or table (from the caption):
2) My (simplified, decoded, in regular language) title for this figure or table:
3) The specific hypothesis being tested, or specific question being asked in the experiment represented here is:
4) If we compare panel(s) _________ and __________, or columns _________ and __________, we learn about :
5) Overall, what we learn from this figure is:
6) The following issues are ones of concern to me: (these can be things you don’t understand or criticisms of the method, questions for the authors, or anything else that comes to mind):


1. **Write**
   Create six questions or prompts about the current topic of study, and write each one on a piece of chart paper or on a white board. Hang or place the questions or prompts in various places around the classroom to create six stations. Images, documents, problems, or quotes may also be used.

2. **Group**
   Group students into teams of three to five students, depending on the size of the class. Each group should start at a different station.

3. **Begin**
   At their first station, groups will read what is posted and one recorder should write the group’s responses, thoughts, and comments on the chart paper or white board. For individual student accountability, you may also have the students record their own responses on a worksheet (see template below), or put their initials below what they wrote. Having different colored markers for each student is also an option.

4. **Rotate**
   After three to five minutes, have the groups rotate to the next station. Students read and discuss the previous group’s response and add content of their own. Repeat until all groups have visited each station. To involve all group members, you can have groups switch recorders at each station.

5. **Monitor**
   As the teacher, it is important to monitor the stations while the students paricipate. You may also need to clarify or provide hints if students don’t understand or misinterpret what is posted at their station.

6. **Reflect**
   Have students go back to their first station to read all that was added to their first
response. Bring the class back together to discuss what was learned and make final conclusions about what they saw and discussed.

**One-minute Papers** In class activity where students are asked an open-ended question and asked to write about it. May be used to illustrate a “muddiest point” or used to start a class discussion. *(Tanner, 2013)*

**Peer Instruction** - Peer Instruction is intended to help break up lecture and help students focus on concepts. You may have encountered peer instruction in the context of clickers. CU Boulder has some fantastic resources about using peer instruction well. [http://www.cwsei.ubc.ca/resources/clickers.htm](http://www.cwsei.ubc.ca/resources/clickers.htm)

**Strip Sequence** Steps to a process are jumbled and taken out of order, and students are asked to put them into the correct order. *(Handelsman, Miller, & Pfund, 2007)*

**Think-Pair-Share or Think Pair Square**

1. **Think** - Have students write a response to a prompt or a question. PreK-K students can draw their thinking.
2. **Pair** - Tell students to pair up and share their responses.
3. **Share** - Reconvene the class and ask pairs to report back on their conversations.


1. **Question**
   Pose a prompt that has multiple answers. Have students write down as many responses as possible.
2. **Whip Around**
   “Whip” around the room, calling on one student at a time. Have students share one of their responses. When called on, students should not repeat a response; they must add something new.
3. **Discuss**
   After completing the whip around, have students discuss which ideas and themes showed up most in their responses.

**Word Wall** - After completing a reading, exercise, or lecture, give students large pieces of paper, marker, and tape. They should write a word worthy of discussion on it and tape it to the wall. Everyone stands at the wall for a whole group discussion of the most frequently occurring or most troublesome terms.
## WORKSHOP ASSESSMENT (Used for pre- and post)

<table>
<thead>
<tr>
<th>I can describe my personal principles and values related to being a teacher.</th>
<th>Strongly Disagree 1</th>
<th>Somewhat Disagree 2</th>
<th>Somewhat Agree 3</th>
<th>Strongly Agree 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can develop my own Teaching Philosophy statement.</td>
<td></td>
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<tr>
<td>I can describe a variety of ways that my students may differ from one another, and from me.</td>
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<tr>
<td>I can describe the elements of a classroom culture that are effective for a spectrum of students.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I can name a variety of actions I could take to foster a positive classroom culture.</td>
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<tr>
<td>I can explain the concept of active learning.</td>
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<tr>
<td>I can develop an effective 15-30 minute “teaching tidbit” that includes specific learning outcomes and assessments and activities aligned to the learning outcomes.</td>
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</tr>
<tr>
<td>I can explain the importance of the proper alignment of Backwards Design elements (learning objectives, assessment, activities).</td>
<td></td>
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</tr>
<tr>
<td>I can write clear and effective learning objectives for a teaching unit.</td>
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<tr>
<td>I can describe the characteristics of good assessments.</td>
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<tr>
<td>I can explain at least five uses/ benefits</td>
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</tr>
</tbody>
</table>
I can explain the difference between formative and summative assessments.

I can create assessment items that are conceptual and challenging for students.

I can describe some of the many and varied active learning approaches.

I can choose appropriate active learning strategies for a set of sample learning objectives and a particular classroom culture.

I can explain how mental models are constructed and changed over time.

I can describe how active learning can help change a student's mental model of a particular concept.

What changes would you suggest for future iterations of this workshop?
WEEKLY POST-SESSION ASSESSMENT

Name: _____________________________________________________________

How valuable was today's session for your teacher training?
1) Not at all valuable
2) Somewhat valuable
3) Valuable
4) Very valuable

What are three things you learned about and/or liked in today's session?

What did not seem to work for you in today's session?

What suggestions for improvement do you have?