Lesson Planning with Backwards Design and TILT

Student Learning Outcomes:

After the session, TAs will be able to:

- **Describe** the value of using student learning outcomes
- **Create** learning outcomes for micro teaching and be able to **develop** for future discussion sections
- **Use** principles of backwards design to align outcomes with learning activities

Activity 1

**Time:** (5 min)

Think of a topic in a chemistry course you have taken or think you may teach this quarter ...

1) List a few things you want your students to learn.

2) Write down how you would determine if students had learned this.

You can call what you want your students to learn a “**Learning Outcome**” *(interchangeable with “learning objective”)*
Activity 2

Time: (5 min)

Compare the following learning outcomes:

- Students will know the elements from the periodic table
- Students will be able to name the elements based on their symbols on the periodic table and identify atomic number and mass.

What’s the difference?

How can we improve?

Circle your answer on the Question below, and write down any notes you have.

With the rephrased your learning outcome, was it easier to determine if students had learned it?

A. I’m still not quite sure what a “learning outcome” is.
B. No, it wasn’t much easier.
C. Yes, it was easier.
D. I already had it phrased as a learning outcome, so it didn’t make much of a difference.

Any other advantages (or disadvantages) you noticed about writing as a learning outcome?
Activity 3

Time: (4 min)

1) Re-write them so that they are SMART and use Bloom’s taxonomy to help.

2) Switch with the same partner and have them write down how they would determine if this new learning outcome was achieved.

Backwards Design

<table>
<thead>
<tr>
<th>Learning Goal</th>
<th>Learning outcome</th>
<th>Assessment</th>
<th>Learning Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will understand the relationship between the electronegativity of two atoms and their likelihood to form given types of chemical bonds</td>
<td>Students will be able to predict which type of bond two given atoms will form based on their electronegativity.</td>
<td>Using a periodic table, students will predict whether two given atoms will form ionic, non-polar covalent, or polar covalent bonds.</td>
<td>Using a periodic table, students will predict the types of bonds formed when metals and non-metals interact, when non-metals and non-metals interact, and when hydrogen and non-metals interact.</td>
</tr>
</tbody>
</table>
Activity 4

Gallery Walk Feedback:

Be specific with your feedback

   Instead of: Great idea!
   Use: Great way to incorporate active learning on that topic.

Ask a question

   Instead of: I don’t get it
   How does your assessment connect to your learning outcomes?

Gallery Walk Instructions

Time: (15 min)

• With your partner, choose one set learning outcomes and assessment strategy and write them on one of the large post-its around the room. (2 min)

• Walk around and provide feedback to your colleagues on their goals and strategies. (10 min)
   – Are the outcomes specific and clearly assessable?
   – Do they represent the cognitive level that we should have our students practicing?

• Look back at your post-it and reassess your sheet (3 min)
Activity 5
Identify the problem
Time: (4 min)

Spectrophotometer Experiment 09/14/2016
I. Prepare and label two cuvettes: Cuvette 1 containing 4 ml distilled water
Cuvette 2 containing 4 ml blood diluted in distilled water Cuvette 1 is the reference cuvette, or blank; cuvette 2 is the sample cuvette. The reference cuvette is used to ‘Zero’ the spectrophotometer. This means that you adjust the Absorbance reading to zero while the reference is in the spectrophotometer. As a result, when you put your sample into the spectrophotometer, the Absorbance measures only absorption by the compound in solution, not absorption by the solvent
2. Read the Absorbance of the sample of diluted blood every 10 nm from 400 to 700 nm. Wherever Absorbance rises significantly, read at 5 nm intervals. Record your data in your notebook.
3. Place a strip of white paper in a cuvette and place the cuvette in the sample holder. Leaving the cover open, rotate the wavelength control slowly from 650 nm to 400 nm. Record the wavelengths at which the color of the incident

Specifically, how does the “better example” compare?
TA as Translator: Aligning Assessments to Learning Outcomes

Student learning outcomes

PURPOSE (what we will do): We will learn how to use the Transparency in Learning and Teaching (TILT) framework to align learning outcomes with assessments, and how to translate this information for our students

TASKS (how we will do it):

- Develop reflective practices that allow us to become more conscientious of our students’ need to understand how assessments align with the learning outcomes for a course.
- Use TILT to revise learning outcomes so that we can translate the purpose, task, and criteria of an assessment to our students.
- Reframe case studies in which outcomes and alignment are disparate.
- Identify when to use microteaching and/or observations for giving feedback to TAs.
### “TA as Translator” Workshop

**Student Voices Video**

<table>
<thead>
<tr>
<th>How do the students describe themselves?</th>
<th>What types of activities are students being asked to do in their classes?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>How do students know if they have succeeded or failed at these activities?</td>
<td>What are some ways that a TA could help these students succeed?</td>
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<td></td>
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</tr>
</tbody>
</table>
Going through Scenarios

Time: (20 min)

**Scenario 1**
The course does not have clear learning outcomes/goals for the students - not in the syllabus, not for any of the weeks. Students keep asking you about what to expect for the midterm exam and you are unsure what to tell them. What could you do?

**Scenario 2**
The course instructor shares the midterm questions with you about a week before the exam. When you first review it, you realize there are several questions that were not covered in class or discussion section and you know students will feel they are unfair. The midterm is in one week. What could you do?

**Scenario 3**
You feel that students in your discussion section are able to memorize material and provide a surface-level understanding, but when you push them further it is clear they really do not understand some of the most important concepts in the course. What could you do?
Real World Example:

Learning objectives

Students will be able to
- convert the wavelength of photons to energy
- describe the energy scale of visible light
- apply the Bohr model of the atom to describe absorption/emission bands of the hydrogen atom

Question

1) Using the Bohr model of the atom to describe what we see in spectroscopy. From problem set 1 (question 9), you have/will solve for the allowed energy level of the hydrogen atom. In question 10, you are asked to look at the first 2 lines in the Lyman series for hydrogen atoms. We will start with the energy levels of hydrogen.

   a. What wavelengths encompass the visible spectrum?

   b. What are the energies of those photons in good units?

   c. What are the first 6 energy levels of a hydrogen atom in good units?  
      (Feel free to collaborate with your neighbors)