

Assessment Progress in Physical Science

Faculty Development Week

Fall 2017

Step One: What Do Faculty Actually Teach?

A survey was given to six faculty who teach Chem 201, asking what specific topics from each chapter they cover. Below is an example of the results obtained.

- **Chapter 4:**

- Do your students memorize solubility rules?

Yes__2__ No__4__

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- Net ionic equations?

Yes__6__ No____

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- Do your students memorize strong/weak acids and bases?

Yes__4__ No__2__

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- Calculating oxidation numbers?

Yes__5__ No__1__

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- Do your students memorize any part of the activity series?

Yes__1__ No__5__

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Step Two: Assessing Prerequisite Skills

- We used an ACS standardized test – the Toledo Exam.
- In general, students begin Chem 201 with little prior chemistry knowledge.
 - Distinguishing between chemical and physical properties (67% correct)
 - Using a density value in a calculation (60)
 - Counting atoms in a chemical formula (59)
 - Isotopes (two questions, 35 and 36%)
 - Periodic trends and predicting reactivity from position on the periodic table
 - Balancing equations (two questions, 21 and 30%)
 - Molarity (two questions, 22 and 31%)
 - Students scored by far the best on the section on math skills – on average, students got questions right 70% of the time in this section.

Step Three: Assessing Student Learning

- On average, scores slightly below national average on an ACS standardized exam (18.7 correct compared to 24, out of 40).
- There was not much difference between various semesters.
- The same test is also used as the pretest for Chem 203, and the scores were 17.4 out of 40.
- A few topics were relatively easy – resonance, diatomic molecules, basic intermolecular forces.
- Other questions were challenging – kinetic molecular theory, bond angles in a Lewis dot structure, and accurately describing what happens when solids dissolve in water.

Future Plans: Targeted Interventions

- One of the biggest learning goals for Chem 201 is stoichiometry.
- According to the assessment results, our students do well on easy questions, but struggle with more challenging ones.
- Can we as a department increase student learning gains in this key topic?
- How can we encourage faculty members to teach this topic more thoroughly?
- How do we conveniently and fairly assess student learning in this one topic?
- What do we do with the results?