



Interactive Computer Tools to Clarify the Role of Nitrogen in Agriculture and the Environment

Introduction

- Nitrogen (N) is essential for most plant and animal life, but it can cause problems when present in excess in the environment.
- Students in agronomic and environmental sciences need to know how to calculate amounts of N for a variety of uses.
- There is tremendous potential for digital and interactive instruction in agricultural and environmental science education to help students visualize key chemical concepts, practice calculations, and provide tools useful in distance education.

Results & Discussion

- We created three interactive educational tools suitable for use in or outside of class.
- Introducing these calculations and concepts early in students' education helps students be less intimidated by, and more engaged with, chemistry and math concepts.
- Knowing how useful these topics will be in their future agricultural and environmental careers is important for students just starting out.
- Learning tools will be integrated into introductory and upper level courses. A study is underway to evaluate their effectiveness using pre- and post-testing.

Materials & Methods

- Brainstorming sessions were held to identify common miscalculations and misunderstandings evident in agricultural and environmental science classes.
- Animal, Soil, and Environmental Science faculty worked with instructional designers to develop tools illustrating how the various forms of N are calculated for protein, pollutants, and fertilizers.
- Digital media products arose through an iterative process of assessing needs, refining learning objectives, storyboarding, prototyping, and testing with the target audience, with continuous collaboration amongst the multidisciplinary team, including chemistry faculty who helped explain various concepts to the designers.
- The N interactive module works on Mac or PC via major web browsers. Programmed in HTML5, it can also be accessed via tablet. Other modules on the website are Adobe Flash-based and require that Flash player be enabled in the browser. Flash-based modules are generally not accessible via mobile device.

Chemistry is everywhere, but students in agriculture may not prioritize understanding chemistry because they don't grasp its importance to their majors and careers.

Modules are freely available at **ScienceofAgriculture.org**

