

BUILDING AN ATOM FROM SCRATCH USING STUDENT PARTICIPATION ON THE LECTURE THEATRE STAGE

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Background

The concept of the atom is one of the first models and ideas presented to students in many chemistry courses. Indeed the introduction provides the foundation for numerous concepts such as reactivity and nuclear transformations. Commonly the concept of the atom is introduced by a visual representation and/or animation or video describing the various sub components (elementary particles) and their properties. Thus the introduction lends itself to various forms of blended learning and a variety of presentation formats addressing many types of student/teacher learning styles (Lockie, van Lanen and McGannon, 2013 & Salamonson et al., 2013 & Oskay et al., 2010). As well, as an introductory topic to chemistry, this is a critical time for many students and may even influence their future engagement, development and success in the course. We have adopted a simultaneous visual representation of the atom illustrating properties in combination with a demonstrative approach on the lecture theatre stage where we use student volunteers to represent fundamental particles.

Aims

Our aim was to develop, implement and refine a novel introduction to the atom illustrating its fundamental components as well as the concepts associated with these fundamental particles such as:

- Electron energy levels
- Size of atoms
- Electron shielding/effective nuclear charge
- Reactivity of atoms
- Nuclear chemistry

Design and methods

We build up an atom from scratch starting with the capture of an electron by a proton using students to represent the fundamental particles on the lecture floor. We sequentially incorporate more students/particles to illustrate the various interactions which take place. Visual representations (Lecture slides) link the demonstration to atomic properties and highlight key aspects such as force distance relationships.

Results

Initial feedback from students was positive in relation to understanding the aspects listed in the aims.

Conclusions

A contemporary and novel approach to introducing the concept of the atom and its fundamental particles and properties which is suitable for students with varying subject knowledge has been incorporated into the first year chemistry course (currently in its fourth iteration and delivery for first year students).

References

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