Science Simulations and Digital Notebooks

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Experiential learning such as a simulation has been promoted as a means to challenge student's misconceptions (McClintock, 2000). Experiential learning encourages higher-order learning, which promotes critical thinking abilities and self-directed learning (Kreber, 2001). Students involved in experiential learning have a greater understanding of their subject matter than students in a traditional lecture-only class (Hakeem, 2001). They are able to demonstrate abstract concepts, allow interaction between users and simulated equipment, and provide users with feedback that allow users to improve their knowledge and skills (ETCourse, 2018).
Why Use Digital Notebooks?

Studies have found that note-taking facilitates the recall of factual information, as well as the synthesis and application of new knowledge.

- Scaffolded notes
- Digital study guide
- Learning log
- Permanent record of learning
Build an atom out of protons, neutrons, and electrons, and see how the element, charge, and mass change. Then play a game to test your ideas! In the first part, the user explores the atomic properties. Using the buttons on the action bar, you can add Protons, Neutrons, or Electrons to the atom. The element name, symbol, structure, makeup, and charge are then shown.
Add a proton
Add a neutron
Add an electron
Add one more neutron
**STRUCTURE OF AN ATOM**

**Proton**  
Found in the nucleus

**Electron**  
Found outside the nucleus

**Neutron**  
Found in the nucleus
Next, the user plays a game to check their knowledge of the different representations by using information on the left side of the page to complete the corresponding representation on the right side of the page. Selecting check will show the user if they are correct.
Select a difficulty level and press the Start button to begin.
Why a -2 charge? What does that mean?
Why is the top right number different than the last one? What does that mean?
Assessment

This subatomic particle is found in the nucleus and has a positive charge.

- proton
- neutron
- electron

The ____ ____ is the number of protons added to the number of neutrons.

- atomic number
- mass number
- atomic mass
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