IMPLEMENTATION PLAN: What is an atom?

50-min class meeting

20 students, in 5 groups of 4

second week of group work (so same groups as previous week)

1. BEFORE CLASS:
   * Make sure that the HTML5 version of the “Build an Atom” PhET simulation will work on the machines and also the browser available in your classroom. The HTML5 version of this simulation usually works on an iPad.
   * URL for PhET simulation:

[http://phet.colorado.edu/en/simulation/build-an-atom](file://localhost/%3Ciframe%20src=%22http/::phet.colorado.edu:sims:html:build-an-atom:latest:build-an-atom_en.html%22%20width=%22800%22%20height=%22600%22%3E%3C:iframe%3E)

1. Group and Role Determination, all sign top of reflector’s sheet (2 min)
2. Model 1 (3 min MAXIMUM)
   * There are no “correct answers”
   * Need to limit the amount of time the groups spend on Model 1 – its function is merely to trigger and access prior knowledge
3. Model 2
   * Key Questions (KQ) #1-5 (7-10 min)
     + No review of KQ#1 or #2
     + Clicker question to summarize group responses to KQ#4 (2min) Term introduction by instructor: *Atomic number* = identifies the element = #protons in an atom.
     + Project answer to KQ#5 from (at least) one group (3-5min);

have presenter explain their evidence – might need time here to identify evidence as obtained by select groups; compare strength of evidence from each group. Term introduction by instructor: The center of an atom is where all of the protons and neutrons, the mass-responsible particles, are located. We call this dense center of an atom the *nucleus*.

* KQ #6 – Check point – be sure groups have discovered how to identify whether an atom is stable or unstable in the simulation (the atom shakes as it becomes unstable); make sure they have generated the correct number of stable hydrogen atoms (2!); can be confirmed by walking from group to group, does not have to be a group report out. Term introduction by instructor: *Isotopes* of an element are atoms of the same element that differ in their masses due to different numbers of neutrons. Not all isotopes of an element are stable! Hopefully you made some unstable hydrogen atoms in simulation! (2 min)
  + KQ #7-9 (7-10 min)
    - Choose one group to present table to the class to prompt discussion of answers to KQ #7 & 8 and the supporting information used. Term introduction by instructor: An atom that has a net charge is called an *ion*. An ion with a net positive charge is known as a *cation*. An ion with a net negative charge is known as an *anion.* (2 min)
  + KQ #10&11 (5 min) – For group to submit to instructor for feedback on writing skills and group reflection on content and Model 1 (to be assessed by instructor after recorder copy is submitted and returned to group before the next group work meeting time)

1. Exercises #1&#2 (application questions; for groups to work on if time remaining; starting points for next class meeting– I can post answers to these once activity is returned)
2. Complete Reflector’s Sheet (5-10min)
3. Additional Exercises for Review: These are from their required text book and they have answers and complete solutions available to them.