What is the result of an increase in ENC?	With increasing ENC the electrons are pulled in with greater force, shrinking the atom.
Why do atomic sizes change very little across a row of transition elements?	In this case, electrons are filling the d subshell below the outer s shell (i.e. the d subshell has a lower n). Thus, the addition of electrons to the d subshell effectively shields the outer electrons, resulting in no change in ENC.
How is atomic size affected by the addition or subtraction of electrons (i.e. the formation of ions)?	Adding electrons increases size because the repulsion felt by the other electrons is not balanced by any additional positive charge in the nucleus. Conversely, taking away electrons reduces size (because of reduced repulsion by other valence electrons, and because the valence shell is usually emptied).

6.12

Define ionization energy (IE).	The energy required to strip an electron from an isolated atom.
How can the IE reaction be represented?	$X(g) \longrightarrow X^{+}(g) + e^{-}$ (Note that g stands for gas. If atoms exist in a gaseous form then they are, by definition, isolated).
What does IE tell us about an atom?	It tells us how tightly the electrons are held by the atom.
What are the units of ionization energy (IE)?	It is expressed in units of kilojoules per mole (kJ/mol) -- in other words, the energy needed to remove an electron from every atom in a mole of atoms.
How many IEs are there for an atom.	There are as many ionization energies as there are electrons.
What is true of successive ionization energies? Why?	The second ionization energy is greater than the first, the third is greater than the second, and so on. In other words, successive ionization energies are larger because it takes more energy to remove electrons from an increasingly positive ion.
Where do the greatest jumps in successive ionization energies occur? Why is this?	The greatest jumps occur when you start taking electrons from the next subshell down, because you have to overcome the inherent stability of a filled subshell. This is especially true when breaking into to the noble gas electron configuration (i.e. the core electrons).
If an ionization energy was large, would it be difficult or easy to remove an electron?	Difficult.
What trends in ionization energy are seen in the periodic table?	Ionization energy increases from bottom to top and from left to right. This is exactly the opposite of the trends in atomic size.
Explain these trends in ionization energy.	As we move up a group, IE increases because the atoms are getting smaller (n decreases). The smaller the atom, the closer the valence electron to the positive nucleus, thus the greater the attraction between charges, thus the harder it is to remove the electron. As we move across a period, the effective nuclear charge increases making it harder to remove electrons.

6.13

Define electron affinity (EA). Show how this can be represented.	The energy change associated with adding an electron to an isolated atom. $X(g) + e^{-} \longrightarrow X^{-}(g)$
What is true of EA for the addition of the first versus the second electron?	The first is usually energetically favorable. The second is not.
What does the sign on the EA indicate?	Negative indicates that it is energetically favorable (i.e. exothermic). A positive means you have to put energy in (i.e. not energetically favorable).
What are the trends for EA in the periodic table? Explain them. (note: an increase in EA indicates an increase in magnitude. For example an EA of -300 is greater than an EA of -200)	EA trends are the same as for IE (increase up a group and across a period). This should make sense: if it is difficult to remove an electron (high ionization energy) it should be easy to add one (high electron affinity).