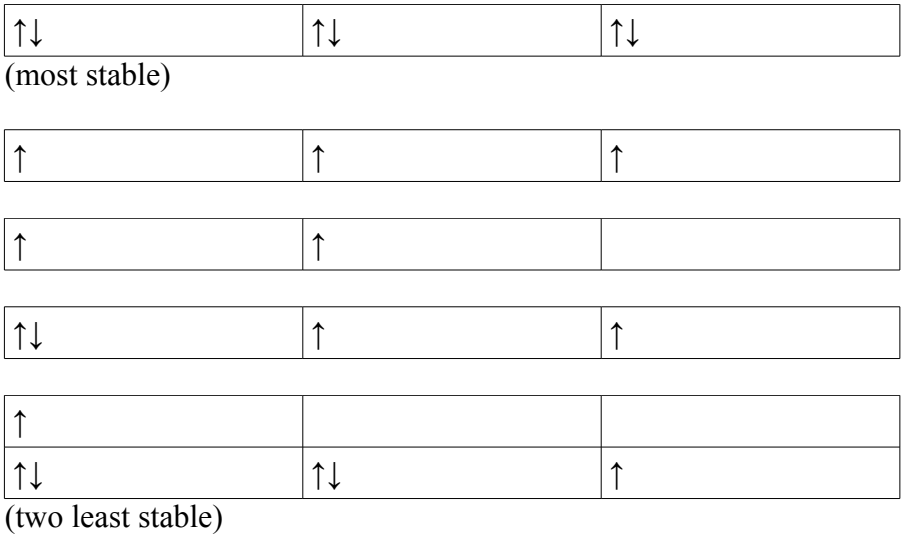
What is John Newland's *law of octaves*?	When the elements were placed in order of increasing atomic mass, there was a progression of properties that repeated every eight atoms.
What did Dmitri Mendeleev do?	Using Newland's observations, he made a periodic table, arranging the elements by order of increasing atomic mass. He found that there should be elements with specific properties to fit the patterns of this table. He predicted these elements and their properties. (They were later discovered). To fit his table, though, Mendeleev had to switch some elements out of their order. He could not explain why.
What did Henry Moseley do?	He found that the lines in the X-ray spectra of elements decreased in a regular manner, corresponding to their atomic numbers.
What is the *Periodic Law*?	When the elements are arranged according to atomic number, the properties of elements change periodically.
What is a period?	A horizontal row in the periodic table. Elements in the same period have the same number of energy shells occupied by electrons.
What is a group?	A vertical row in the periodic table. Elements in the same group have the same number of valence electrons. (Group 1 elements have 1 valence electron, group 2 have 2, group 13-17 have 3-7, and group 18 have 8, besides helium, which has 2.)
Which groups are more reactive? Which are less?	Groups that are closer to the octete - eight electrons - are more reactive. Therefore, groups 7 and 1 are the most reactive- and very prone to react with one another, as they complete each other's octetes. Groups 2 and 6 are less reactive, then 3 and 5, then 4. Group 8 is nearly nonreactive.
Which are the main-group elements?	Groups 1, 2, and 13-28. These are the s and p blocks.
What are the alkali metals?	Group 1, besides hydrogen. ● Metals ● Usually solid at room temperature ● Conductors of heat and electricity ● Metallic luster ● Very reactive with water and oxygen ○ Stored in oil and many layers of protective covering to prevent these reactions ● 1 valence electron ● Very reactive because they're close to an octete ● Very reactive with group 17 (halogens) Their reactivity increases as size does. When protons are added there's less pull to the valance electrons, allowing bonds to form more readily.
What are the alkaline-earth metals?	Group 2. ● Highly reactive (just less so than group 1 or 17) ● 2 valence electrons

	• Harder and higher melting points than alkali metals
What are the halogens?	Group 17. • 7 valence electrons • Highly reactive with alkali metals • React with most metals to produce salts
What are the noble gasses?	Group 18. • 8 valence electrons • Almost completely nonreactive, inert Helium has 2 valence electrons, because they only fill the first energy shell and the first shell only fits two electrons.
What is hydrogen?	The most common element in the universe. About ¾ of all atoms are hydrogen. Because it has one proton and one electron, hydrogen behaves differently from all other atoms and therefore is a class by itself in the periodic table. Hydrogen is extremely reactive.
What are the transition metals?	Groups 3-12, the D block. • Conduct electricity and heat • Have a usually silver shine/luster • Ductile • Soft and malleable • Act inconsistently with other elements- they react, often, to gain the stability of a half-filled shell even if it does not satisfy the octete
What is an alloy?	A mixture of metals.
What does ductile mean?	Able to be pulled/squeezed into wire
What does malleable mean?	Can be hammered or rolled into sheets, easily molded
Why do metals conduct electricity so well?	They lose electrons. As electrons are added to metal molecules in the form of electricity, they soon move to the next molecule.
What is the order of shell stability?	
What are the lanthanides and	The elements that fill the F block. Lanthanides are 58-71 and

actinides?	actinides are 89-103.
What is significant about the nuclear structures of the actinides?	They are unstable and spontaneously break, making these elements radioactive.
What is a periodic trend?	A predictable change across a period or down a group.
What is a cation?	A positively charged ion.
What is an anion?	A negatively charged ion.
What is ionization energy?	The energy needed to remove an electron from an atom. Atom + Energy --> Atom(+) + electron(-). This energy is needed to overcome the nucleus's attractive force.
How does ionization energy change across a period?	It increases, since, as protons are added, the nuclear attraction is increased, in greater force than the that of the electrons. The atom becomes “tighter”.
How does ionization energy change down a group?	It decreases, because, as more energy shells are added, valence electrons are more loosely held and are therefore easier to remove.
What is electron affinity?	An electron's ability to attract towards itself and hold additional electrons.
How does electron affinity change across a period?	It increases, as the nuclear attraction becomes stronger.
How does electron affinity change across a period?	It decreases. As energy shells are added, the inner electrons shield the outer ones from the nucleus's pull.
What is electron shielding?	The inner electrons shield the outer ones from the nucleus's pull.
How does electron shielding change across a period?	It decreases, slightly. As protons are added, they have greater force than the added electrons and overwhelm them.
How does electron shielding change down a group?	It increases, as more electrons are added.
What is the atomic radius?	The space from the nucleus to the edge of the outermost electron orbital.
What are the problems with measuring this?	The electron orbitals have fuzzy, indefinite edges.
How is the atomic radius measured?	The bond radius- the distance between the nuclei of two bonded atoms of one element- is divided in two.
What units are used to measure the atomic radius?	Pico-meters- 10*-12
How does the atomic radius change across a period?	It decreases, as the nuclear force pull the electrons in slightly.
How does the atomic radius change down a group?	It increases, as more energy levels are added.

What is electronegativity?	A measure of the ability of an atom in a chemical compound to attract towards itself the shared electrons of a covalent bond. When covalent bonds form, electrons are “shared”. Electrons are drawn to the more electromagnetic atoms, giving them an ishy (δ is the symbol) change.
How does electronegativity change across a period?	It increases. As protons are added, their ability to attract electrons increases.
How does electronegativity change down a group?	It decreases, as the electrons shield the nucleus's pull.
Why are melting and boiling points different than other trends?	They don't increase or decrease consistently down groups or across periods. They follow different patterns of change. They have to do with the number of valence electrons and atomic stability. Stability can be achieved by the octete, at the edges of the table, or by a half-filled shell, which is closer to the middle, so the melting and boiling points don't follow normal patterns.
What is a nuclear reaction?	A reaction that affects an atom's nucleus.
What is a transmutation?	Combining or decomposing nuclei to create new elements.
What is a superheavy element?	Elements after 106.
What is a synthetic element?	Elements after 93.