Review for pH/Acids/Bases/Matter Test

First things first…

- Let’s talk about what MATTERS…. ☺
- Matter is everything…everything that has volume and takes up space
- Anything that is not matter is ENERGY

- All matter (AKA everything but energy) is made up of ATOMS.
- An atom includes a nucleus with protons and neutrons that is surrounded by the electron cloud
- There are 118 types of atoms…why?
- Because there are 118 types of ELEMENTS
- An atom with one proton = helium

  2 protons = helium

  3 protons = lithium and so on…

Atoms

- Each element is classified by how many protons are in the nucleus
- There are 118 elements
- Each element is made up of it's particular atom
- An atom with 6 protons is a carbon atom and a bunch of atoms with 6 protons together is also carbon (**carbon** is the backbone of all living things!)
- IF IT IS NOT ON THE PERIODIC TABLE, IT IS NOT AN ELEMENT

Molecules

- Molecules are two or more pure elements (AKA two or more different types of atoms) chemically combined
- Examples include water (H_20), carbon dioxide (CO_2), and sugar ($C_6H_{12}O_6$). Just because the molecule is long and complex does not mean it is not a molecule. It only matters that the elements are chemically combined to make one functioning "thing" and they cannot be separated by physical means
- Above, sugar has 3 elements (carbon, hydrogen, and oxygen) and 24 atoms (six carbons, 12 hydrogens, and six oxygens)

Mixtures

- Mixtures are when you combine lots of different things together (elements + compounds)
- For example, grape juice contains lots of chemicals, water, fructose, sugar etc.
- Mud contains minerals, rock, water, etc., therefore, it is a mixture too

Pure vs. Impure substances

- We've already talked about mixtures, and that they are a mix of different things.
- In lab, we mixed melted pure substances vs. impure substances
- What we found was that PURE substances had a small RANGE of melting because every substance has measurable properties (like melting temperature)
- Because of this fact, if you combine lots of pure substances together, each will have a different melting temperature and so your melting range will be LARGE
- It does not matter how low or high the number is, but how small or large the RANGE is....or the difference between start and stop of melting

pH

- pH is the measure of H+ (hydrogen ions) in a solution
- The more H+ ions, the more acidic
- The more OH- (hydroxide ions) the more basic a solution

Acids vs. Bases

- Pure water is neutral, or has a pH of 7
- Anything ABOVE 7 is BASIC
- Anything BELOW 7 is ACIDIC
- Bases like ammonia and bleach are usually bitter
- Acids like lemon juice and vinegar are sour

The pH scale

- The pH scale goes from 0-14
- Between each unit is a 10x difference in acidity/basicity or a 10x increase/decrease in H+ ions
- Therefore, is a solution had a pH of 7 and another had a pH of 13, how much more basic is the second solution?

  13 – 7 = 6

  Add 6 zeros after the 1

  =1,000,000

  Answer: The second solution is a million times more basic

Water

- Water is a POLAR molecule, which means it possesses a positive and negative charge across the molecule
- WITHIN a water molecular are **covalent** bonds
- BETWEEN neighboring water molecules are **hydrogen** bonds.