

**Chapter 22 - 25 Review**

**Vocabulary** - Know the following vocabulary and how to apply them.

1. Neutralize	A. When pollution causes rain to be acidic (pH of less than 5.6).	1. Weak Acid	A. The measure of acids and bases.
2. Neutral	B. To mix acids and bases to cancel each other out and make salt water.	2. pH	B. The product of a neutralization reaction between an acid and a base.
3. Acid Rain	C. Equal number of H <sup>+</sup> and OH <sup>-</sup> ions; water is an example.	3. Strong Acid	C. A compound that adds a few H <sup>+</sup> ions to water.
4. Acid	D. A compound that adds OH <sup>-</sup> ions to water.	4. Salt Water	D. A compound that adds a lot of H <sup>+</sup> ions to water.
5. Base	E. A compound that adds H <sup>+</sup> ions to water.	5. Weak Base	E. A compound that adds a few OH <sup>-</sup> ions to water.
1. Alpha Particle	A. The largest natural element. Fuel for fission reactors.	1. Chain Reaction	A. Combining smaller atoms into larger atoms. Harmless products; stars use this.
2. Gamma Ray	B. Can be stopped by wood; occurs when a neutron breaks into a proton and electron.	2. Fission	B. Splitting large atoms into smaller ones. Toxic by-products.
3. Beta Particle	C. An atom that emits energy or a particle.	3. Fusion	C. When one fission causes another and another, etc. Sustains a fission reaction.
4. Radioactive	D. A helium nucleus (2 protons and 2 neutrons); low in energy.	4. Half-life	D. Using the known decay of an isotope to determine the age of objects.
5. Uranium	E. Powerful radiation that can cause biological damage; takes many feet of concrete to stop.	5. Carbon Dating	E. The time necessary for 50% of a radioactive sample to decay.
1. Solution	A. When a substance cannot be dissolved into a solution.	1. Supersaturated	A. When a solution can hold more solute (it's not full yet).
2. Alloy	B. A mixture of two metals.	2. Saturated	B. When a solution can't hold more solute (it's full).
3. Dissolve	C. A mixture that is homogeneous at the molecular level.	3. Tyndall Effect	C. When a solution has more solute than it can hold (it's over full).
4. Suspension	D. When something seems to disappear into a solution.	4. Unsaturated	D. The part of a solution that is biggest. (The water in salt water.)
5. Colloid	E. A mixture that scatters light and the particles do not settle out.	5. Solute	E. The scattering of light in a colloid.
6. Insoluble	F. A temporary mixture; the particles will eventually settle.	6. Solvent	F. The part of a solution that is smallest. (The salt in salt water.)

**Nuclear Reactions** - Know the three kinds of radioactive decay: alpha; beta; gamma (what they are and how dangerous they are). Know the differences between fission and fusion including: chain reactions; waste products; amount of energy produced. Be able to distinguish alpha from beta decay. Be able to do simple half-life problems.

Why do very large atoms decay (break down) more often than smaller atoms?

Which of the three kinds of radiation is dangerous to us and why?

What happens to a neutron in beta decay?

Fusion or fission?

Dangerous waste products:

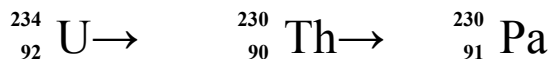
Splitting of large atoms:

Powers the sun:

Clean, powerful nuclear energy:

Name: \_\_\_\_\_

Period: \_\_\_\_\_

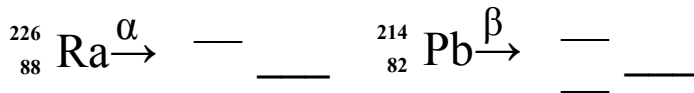
Classify these nuclear reactions as alpha  $\alpha$  or beta  $\beta$  decay:

You have 800 kg of a radioactive substance with a short half-life of 500 years. How much will be left after these times:

500 years                      1,000 years                      3,000 years

Fill in the missing information:

A radioactive substance has a 100-year half-life. If you now have 30 kg of this substance, when did it have these amounts:



60 kg                      120 kg                      180 kg

**Solutions** — Know what a solution is. Know the distinguish the differences between solutions, colloids, and suspensions. Know why water is a polar molecule and why we call it the “nearly” universal solvent. Be able to tell the difference between solute and solvent; polar vs. non-polar; soluble vs. non-soluble. Know the difference between unsaturated (not full), saturated (full), and supersaturated (over-full).

To dissolve in water a compound must be:

Polar or non-polar?  
Soluble or insoluble?  
Ionic or covalent?

Solute or solvent?

The small amount; the large amount  
Salt in water  
Gold in 18 karat gold; silver in 18 k gold.  
A solution of 75% water and 25% HCl

Circle the ones that are soluble in water.

CO                      MgO                      N<sub>2</sub>F<sub>3</sub>  
Ca(NO<sub>3</sub>)<sub>2</sub>                      C<sub>2</sub>F<sub>4</sub>                      CaF<sub>2</sub>

Solution (So); Colloid (C); Suspension (Sp)

Milk in water \_\_\_\_\_ Doesn't settle; scatters light \_\_\_\_\_

Vinegar in water \_\_\_\_\_ Doesn't scatter light or settle \_\_\_\_\_

Sand in water \_\_\_\_\_ Settles and scatters light \_\_\_\_\_

The solubility of NaCl is 40 g/100 mL at 50° C. If you dissolve 60 g of NaCl in 200 mL of water can you dissolve more? Yes/No?

If so how much?

Is the solution: unsaturated, saturated, supersaturated?

**Acids and Bases** — Know the differences between acids and bases. Know that as a solution becomes more acid (closer to 0) it has more H<sup>+</sup> ions and less OH<sup>-</sup> ions; as it becomes more basic (closer to 14) it has more OH<sup>-</sup> ions and less H<sup>+</sup> ions. Know what happens when you mix acids and bases.

Circle the acids and underline the bases.

H<sub>2</sub>(PO<sub>4</sub>)                      HF                      Ca(OH)<sub>2</sub>  
Ca(OH)<sub>2</sub>                      NaOH                      H(NO<sub>3</sub>)

Solution A (pH 0); Solution B (pH 3.2)

Which one has less H<sup>+</sup> ions?Which one has less OH<sup>-</sup> ions?

Solution A (pH 8.5); Solution B (pH 12)

Which one has fewer OH<sup>-</sup> ions?Which one has less H<sup>+</sup> ions?**Acids or Bases? (below)**

Has fewer H <sup>+</sup> ions:	pH below 7:
Has fewer OH <sup>-</sup> ions:	Feels “squeaky clean”:
Has more H <sup>+</sup> ions:	Tastes bitter:
Has more OH <sup>-</sup> ions:	pH above 7:

Finish this neutralization reaction: (balance the salt, too).



Names:

What property of water causes acids and bases to dissociate?