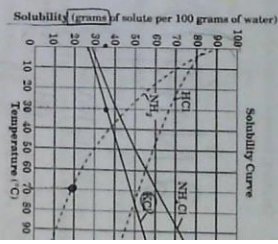
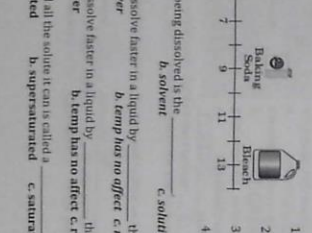


- What three methods can we undergo to increase the rate of dissolving?
 - heat up
 - stir up
 - increase surface area
- Of the compounds listed to the left, which is least soluble at 70 °C?
 - NH_3
- Of the compounds listed to the left, which is least soluble at 10 °C?
 - KNO_3
- If we want a saturated solution of KCl at 30 °C, how much solute do we need to add to 100 g of water?
 - 35 grams
- At what temperature do NH_4Cl and HCl have the same solubility?
 - 30 °C



- Are the following acid, base, or neutral?
 - a. The compound tastes bitter. B
 - b. The compound feels slippery. A
 - c. The chemical formula is HClO_2 . A
 - d. The substance reacts with metals and turns litmus paper red. A
 - e. The substance is NaOH . B
 - f. When an acid and base react to form salt and water. Neutralization
- Order the following from most basic to most acidic.
 - 1. Cola
 - 2. Cheese
 - 3. Tap Water
 - 4. Bleach
- In a solution, the substance being dissolved is the solute.
 - a. solute
 - b. solvent
 - c. solution
 - d. none of the above
- You can make most solids dissolve faster in a liquid by lower the temperature.
 - a. lower
 - b. temp has no effect
 - c. raised
 - d. keep the same
- You can make most gases dissolve faster in a liquid by lower the temperature.
 - a. lower
 - b. temp has no effect
 - c. raised
 - d. keep the same
- A solution that has dissolved all the solute it can is called a saturated solution.
 - a. unsaturated
 - b. supersaturated
 - c. saturated
 - d. what is a solution?



- A solution is a _____ where a substance is dissolved into another substance.
 - Solvent - the part of the solution that is being dissolved
 - Concentrated vs. Diluted (circle or answer)
 - A concentrated solution has a (high/low) relative amount of solute.
 - A diluted solution has a (high/low) relative amount of solute.
 - How do you make lemonade more sweet (more concentrated) or less sweet (more diluted)?
 - Stirring
 - More surface area / Smaller particle size
 - Higher temperature
 - The rate at which substances dissolve can be (increased/decreased) by:
 - Stirring
 - More surface area / Smaller particle size
 - Higher temperature
- Solubility: _____ of a solute that dissolved in a given amount of solvent at a given _____

Types of Solutions

- A saturated contains all the solute it can hold at that temperature
- An unsaturated can hold more solute at its current temperature
- A supersaturated was saturated, then cooled. These solutions are unstable and solute can come out. (crystal lab)

- Choose Base or Acid. Acids
 - Sour taste
 - Corrosive
 - React strongly with metals
 - Turn litmus paper red
 - Begin with Hydrogen
- Properties of BASE
 - Bitter taste
 - Feel slippery in solution
 - Corrosive
 - Bitter taste
 - Turn litmus paper blue
 - End in OH

Measuring Acidity

The measure of the concentration of H^+ ions in a solution is called pH.

The scale ranges from 1 to 14

← Acids = H^+ = 0-7

Neutral = water = 7

Bases = OH^- = 7-14

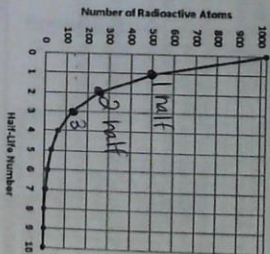
When an acid reacts with a base, the products are a salt and water.

Acid + Base → Salt + Water

3. If 20.0 g of a radioactive isotope are present at 1:00 PM and 5.0 g remain at 2:00 PM, what is the half-life of the isotope?

4. Using the graph answer the following:
 A. What is the half-life of this atom?
 B. How much remains after 5 days?
 C. After 3 half-lives how many parent atoms will remain?

Match the rays with the following letters. Each ray may be used once, more than once, or not at all.
 a) alpha
 b) beta
 c) gamma



- A 1. Two protons and two neutrons
 B 2. High speed electron
 C 3. Heaviest particle
 D 4. ^4_2He
 E 5. Higher energy than x-rays
6. No mass or charge
 7. Helium nucleus
 8. $-1e$

Complete the following nuclear equations:

- $^{60}_{27}\text{Co} + {}^1_0\text{n} \rightarrow {}^{60}_{28}\text{Mn} + \square$
- ${}^{14}_6\text{C} \rightarrow {}^{14}_7\text{N} + \square$
- ${}^{90}_{42}\text{Mo} \rightarrow \square + {}^{90}_{43}\text{Tc} + {}^0_{-1}\text{e} + \square$
- ${}^{39}_{19}\text{K} + \square \rightarrow \square + {}^{39}_{18}\text{Ar}$

Energy in Reactions

- Endothermic Reactions \rightarrow When a reaction absorbs energy, it feels _____
- Exothermic Reactions \rightarrow When a reaction releases energy, it feels _____
- Increasing the temperature of a reaction will _____ the rate of reaction.
- Stirring a reaction will _____ the rate of reaction.
- Decreasing surface area will _____ the rate of reaction.

Nuclear Chemistry

Alpha Particles

- 2 protons and 2 neutrons
- Same as nucleus of Helium atom with a charge of +2 and atomic mass of 4
- Carry most of mass + charge so lose energy quickly
- Least penetrating form of nuclear radiation

Beta Particles

- Electron emitted from nucleus, Negative charge
- Much faster and more penetrating
- Stopped with metal

Gamma Radiation

- The most energy of any kind of radiation, No mass, no charge
- Travels at speed of light
- To stop - thick blocks of lead and concrete

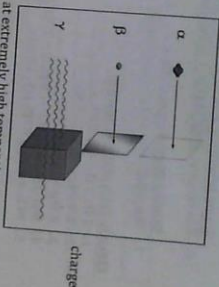
Nuclear Fusion

Joining of 2 atomic nuclei of smaller masses to form a single nucleus of larger mass. Only occurs at extremely high temperatures.

Nuclear Fission

Splitting of atomic nuclei into 2 smaller nuclei of approximately equal mass

Balancing Decay Reactions



- Sum of Numbers on top left = top right
- Sum of Numbers on bottom left = bottom right

- Parent radi(is)otope is the beginning element
- Daughter radi(is)otope is the ending element

Nuclear Half-Life Problems

- Half-life is the amount of time for _____ the parent radi(is)otope to decay.

2. How long does it take a 100.00g sample of Au-198 to decay to 6.25g if it has a half-life of 2.69 days?

$$\frac{100g}{2} = \frac{50g}{2} = \frac{25g}{2} = \frac{12.5g}{2} = 6.25g = 4 \text{ half lives}$$

$$4 \times 2.69 = 10.76 \text{ days}$$

1. A Chemical Reaction is a chemical change in which one or more substances are converted into substances
2. Law of Conservation of Mass - Matter cannot be _____ or _____ but transform into different forms and substances.
3. In a chemical reaction, the total mass of the products must always _____ to the mass of the reactants

Types of Reactions

Synthesis Reactions: $A + B \rightarrow AB$
 4. Two or more substances combine to form another substance

Decomposition Reactions: $AB \rightarrow A + B$
 5. One substance decomposes, or breaks down, into two or more substances

Single Displacement: $A + BC \rightarrow AC + B$
 6. One element replaces another element in a compound

Double Displacement: $AB + CD \rightarrow AD + CB$
 7. The positive ions of two compounds replace each other to form two compounds

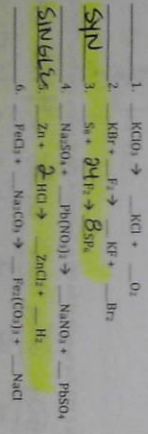
Classify Each of the following

1. $2H_2 + O_2 \rightarrow 2H_2O$
2. $2NaN_3 \rightarrow 2Na + 3N_2$
3. $2Mg + O_2 \rightarrow 2MgO$
4. $Mg(OH)_2 + 2HCl \rightarrow MgCl_2 + 2H_2O$
5. $PCl_5 + H_2O \rightarrow H_3PO_4 + 3HCl$

Balancing Chemical Equations

- Because mass must be conserved, coefficients are used to balance an equation
- The same number of atoms of each element must be on both sides of the equation
- Remember your process:
 - Check which atoms are balanced or not
 - Start with the most difficult to balance
 - Multiply atoms or entire compounds by coefficient to balance each side

1. Balance the equation.
2. Identify the type of reaction (synthesis, decomposition, single displacement, double displacement, combustion.)



Writing Ionic Formulas

Cl^-	NO_3^-	S^{2-}	CO_3^{2-}	N^{3-}	PO_4^{3-}	OH^-
Na^+						
Sn^{2+}						

Naming Ionic Compounds

Cation	Anion	Formula	Name
Cu^{2+}	OH^-		
Ba^{2+}	SO_4^{2-}		
NH_4^+	CrO_4^{2-}	$(NH_4)_2CrO_4$	Ammonium dichromate
Ag^+	$CH_3O_2^-$		
Fe^{2+}	S^{2-}	FeS	Iron Sulfide

Writing Formulas of Binary, Nonmetal Compounds

Name	Formula	Name	Formula
nitrogen trifluoride	NF_3	phosphorus trichloride	
nitrogen monoxide	NO	phosphorus pentachloride	

Naming Binary, Nonmetal Compounds

Name	Formula	Name	Formula
nitrogen dioxide	NO_2	hydrogen bromide	HBr
nitrogen pentoxide	P_2O_5	hydrogen fluoride	HF

Practise for Both Types of Compounds

Formula	Name	Formula	Name
HCl		SO_2	carbon dioxide
PCl_5		$CaCl_2$	ammonium carbonate
K_2S	potassium sulfide	CaI_2	sulfur dichloride
N_2O_5			calcium iodide
ClF_3	chlorine trifluoride		beryllium fluoride
$Al(OH)_3$			magnesium perchlorate
NCl_3			potassium permanganate

- Match the correct term to its definition by writing the letter of the correct blank.
- Atom
 - Negatively Charged Particle
 - Proton
 - Smallest unit of matter
 - Electron
 - Nucleus
 - Positively charged particles

Atoms, Ions & Isotopes

For each substance listed below, you have been given enough information to fill in all the blanks. Then decide if the atom is an isotope, a positive ion, a negative ion or a neutral atom.

Substance	Symbol	Atomic number	Mass number	Number of Protons	Number of Neutrons	Number of Electrons	Isotope, Atom, or Ion
Aluminum	Al	35	27	13	45	13	
Bromine	Br	92	80	45	146	36	
Uranium	U						

Answer the following questions.

- Which element is the most reactive (metals)? Francium
- What is a valence electron? Outer shell electron
- What happens to an atom that gains an electron? becomes negatively charged
- Which elements tend to lose electrons? metals
- Which elements tend to gain electrons? nonmetals
- Which group has a full outer shell of electrons? noble gases

Describe all of the **TRENDS** of the periodic table.

	Trend Going Across a Period	Trend Going Down a Group
Atomic Radii	<u>smaller</u> →	<u>larger</u> ↓
Atomic Mass	<u>larger</u> →	<u>larger</u> ↓
Reactivity	<u>decrease</u> →	<u>increase</u> ↓

Determine whether the following is a chemical or a physical change.

- Food spoils
- Iron rusts
- Sugar dissolves in water
- A ring of iron forms around your thumb
- Soda pop fizzes when the top is opened
- A piece of metal is hammered into a thin sheet
- Wood is burned
- A firecracker explodes

Chemistry Review Sheet

Name _____

Physical or Chemical Changes?

- Melting Butter P
- Cooking an egg C
- Chopping up a zucchini P
- Using your teeth (alone) to chew up a piece of steak P

Classification of Matter (element, compound, mixture)

- Water C
- Phosphorus E
- Sand M
- Sugar C

Element Math

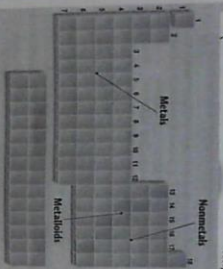
- Atomic Mass = # of p + # of n
- The number of protons for the number of electrons is found in the atomic number
- So, if we have Carbon, the atomic number is 6, the atomic mass is 12 (round to closest whole number). The number of neutrons is 6

Symbol
A one- or two-letter abbreviation derived from the element's English or Latin name.

Element's common name: Carbon
 Atomic Number: 6
 Mass Number: 12 011

Atomic Number
Equal to the number of protons in the nucleus, as well as the number of electrons in the electron cloud.

Atomic Mass
Weighted average of the masses of all the element's isotopes. Rounding the atomic mass to the nearest whole number yields the mass number of the most common isotope.



- The Periodic Table is filled in the blank.
- Each row is called a period. Each row starts with an atom with one electron in the outer energy level and ends with an atom that has a full outer energy level.
- The Periodic Table has 3 main sections of elements with similar properties:
 - Metals are good conductors and lose electrons to become positive ions.
 - Nonmetals are poor conductors and gain electrons to become negative ions.
 - Metalloids have properties of both groups.
- The halogen family has a full outer shell of electrons or 8 valence electrons and include the elements fluorine, chlorine, bromine, and iodine and are all gases and one liquid at room temperature.
- The alkaline earth family include chlorine and iodine and are all gases and one liquid at room temperature.
- The transition metals are groups 3 through 10.
- The alkali metals are the most reactive group on the periodic table.
- The main group elements are located at the bottom of the periodic table.