

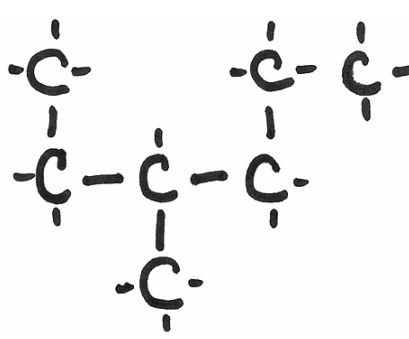
Midterm Topic Review

Station 1

(Unit 1) - HYDROCARBONS

Fill in this chart of formulas and names of hydrocarbons:

C_3H_8		C_5H_{10}		C_4H_6
	nonene		hexane	

<p>Draw the molecule with the name: 2,3,3-trimethyloctane</p>	<p>What is the name of this hydrocarbon?</p> 
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Midterm Topic Review

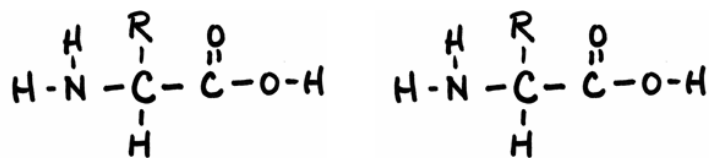
Station 2

(Unit 1) - FUNCTIONAL GROUPS

Label these pictures with the type of functional group:

$R-\overset{\overset{O}{\parallel}}{C}-H$	$R-O-R$	$R-\overset{\overset{O}{\parallel}}{C}-O-R$	$R-OH$	$R-\overset{\overset{O}{\parallel}}{C}-OH$	$R-\overset{\overset{O}{\parallel}}{C}-R$

Look at the two amino acids. Draw a BOX around the "amine group." Draw a circle around the "acid group."
Draw the molecule formed when these two amino acids join to form the beginning of a protein:



Midterm Topic Review

Station 3

(Unit 2) - MEASURING CHEMICALS

Calculate the molar mass of $\text{Ba}(\text{NO}_3)_2$.

Calculate the percent composition of each element in the following compound.

$\text{Ba}(\text{NO}_3)_2$	Ba = _____ =	N = _____ =	O = _____ =
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List the 7 diatomic elements:							
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Midterm Topic Review

Station 4

(Unit 2) - MOLE PROBLEMS

Solve the following mole problems:

How many moles of CO_2 (MM = 44.0 g/mol) are in 11.0 grams of CO_2 ?

What volume (in Liters) does 20.0 grams of butane, C_4H_{10} , occupy at STP? (MM C_4H_{10} = 58.14 g/mol)

Consider the balanced equation: $\text{N}_2(\text{g}) + 3 \text{H}_2(\text{g}) \rightarrow 2 \text{NH}_3(\text{g})$

molar masses: (28.02) (2.02) (17.04)

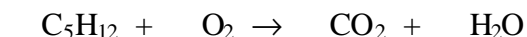
How many grams of $\text{NH}_3(\text{g})$ is formed when 10.0 grams of $\text{H}_2(\text{g})$ reacts?

Midterm Topic Review

Station 5

(Unit 3) - REACTIONS

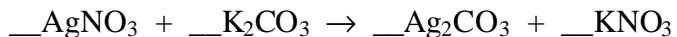
Balance these equations and classify their type (single replacement, double replacement, etc.)



Classify this reaction: _____



Classify this reaction: _____



Classify this reaction: _____

Circle which factor(s) were used to speed up the following reactions and demonstrations:

Demonstration/Reaction	Factors that affect reaction rate		
cotton burning in air vs. cotton burning in pure O ₂ (Halloween)	concentration	temperature	catalyst
hydrogen peroxide before and after yeast is added (Airs Lab)	concentration	temperature	catalyst
Elephant Toothpaste before and after KI is added (Demo)	concentration	temperature	catalyst
water bath & conc. H ₂ SO ₄ added to alcohol + acid (Making Ester)	concentration	temperature	catalyst
Spinning the turntable for the Flame Tornado (Halloween)	concentration	temperature	catalyst
Dropping the lycopodium powder onto the flame (Halloween)	concentration	temperature	catalyst

Midterm Topic Review

Station 6

(Unit 3) - REACTIONS

Determine the # of ions needed to make a neutral compound and then write the formula:

# Cations	Cation	# Anions	Anion	Formula
	Na ⁺		PO ₄ ³⁻	
	Sn ⁴⁺		Cl ⁻	
	Al ³⁺		OH ⁻	
	NH ₄ ⁺		SO ₄ ²⁻	

Circle the element being *oxidized* in this equation: $\text{Cu(s)} + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{Cu(NO}_3)_2(\text{aq}) + 2\text{Ag(s)}$

Match the recipe, gas, and test by drawing lines between the columns:

H ₂ O ₂ + yeast hydrogen peroxide + yeast	H ₂	turns limewater cloudy
Zn + HCl mossy zinc + pool acid	O ₂	burning splint pops
CaCO ₃ + HC ₂ H ₃ O ₂ chalk + vinegar	CO ₂	glowing splint re-lights

Midterm Topic Review

Station 7

(Unit 4) - ACIDS & BASES

Match the terms with the following statements. Each term may be used once, more than once, or not at all.

- a) acid b) base c) both acid and base d) neither acid nor base

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|------------------------------|--|
| ___ 1. pH = 5 | ___ 9. milk of magnesia, $Mg(OH)_2$ |
| ___ 2. tastes bitter | ___ 10. alkaline |
| ___ 3. electrolyte | ___ 11. tastes sour |
| ___ 4. vinegar, $HC_2H_3O_2$ | ___ 12. turns cabbage juice blue, green, or yellow |
| ___ 5. increases $[OH^-]$ | ___ 13. household ammonia |
| ___ 6. neutralizes NaOH | ___ 14. pH = 7 |
| ___ 7. feel slippery | ___ 15. can burn your skin |
| ___ 8. Na_2SO_4 | ___ 16. high pH |

List the strong acids :						
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A $1.0 \times 10^{-4} \text{ M}$ solution of HCl has a pH of _____ and a pOH of _____.

Midterm Topic Review

Station 8

(Unit 4) - SOLUTIONS

Calculate the concentration of each of these mixtures: (molar mass of NaOH = 40.0 g/mol)

4 moles NaOH in enough water to make 2 L of solution. $[NaOH] = \underline{\hspace{2cm}} \text{ M}$

3 moles NaOH in enough water to make 6 L of solution. $[NaOH] = \underline{\hspace{2cm}} \text{ M}$

1.5 moles of NaOH in enough water to make 500 mL of solution. $[NaOH] = \underline{\hspace{2cm}} \text{ M}$

10 grams of NaOH in enough water to make 2 L of solutions. $[NaOH] = \underline{\hspace{2cm}} \text{ M}$

A 12 M solution of HCl is used to make 2.5 L of 3 M HCl. What volume of the concentrated acid is needed?

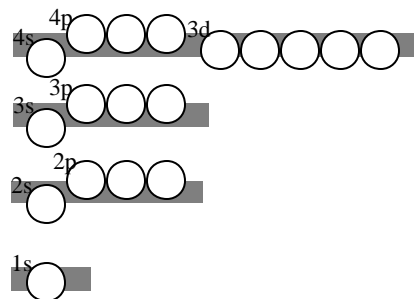
A 45 mL sample of 6 M HCl is diluted to a volume of 250 mL.
What is the concentration of the diluted solution?

An 8 mL sample of vinegar with an unknown concentration is titrated to a pink endpoint with 30 mL of 0.5 M NaOH solution. What is the concentration of the vinegar? M

Fill in this chart:

atom	mass	# p+	# n°	# e-
Na	23			
Cu	63			
	24	12		
	80	35		
		9	10	
Mg ²⁺	24			
Cl	35			

Fill in the *orbital diagram* for As (#33)



Finish the *electron configuration* for this atom:

1s 2s 2p 3s 3p 4s 3d 4p

How many electrons would you “bump into” when you approach this atom? _____