Faculty Submitting: James Grinias

Specify here whether "Pre" or "End" of Unit and the Unit #: End Unit 3

LOs: *Perform calculations using Avogadro's number and use the concept of the mole to convert between atomic/molecular and macroscopic quantities* *Determine the empirical and molecular formulas of compounds from elemental analysis data* *Calculate molarity for solutions and molarity of diluted solutions.*	
Unit 3_ Question 1	**Canvas Question Type:** Formula
	What is the total mass (amu) of carbon in $C_{[a]}H_{10}O_{[b]}$?
	a*12.01 Let [a] = 4-12 (vary by 1) and let [b] = 4-8 (vary by 1).
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Unit 3_ Question 2	**Canvas Question Type:** Formula
	What is the total mass (amu) of carbon in $CH_3(CH_2)_{[a]}CH_3$?
	24.02+(12.01*a) Let [a] = 1-15 (vary by 1).
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Unit 3_ Question 3	**Canvas Question Type:** Multiple Choice
	Compare 1 mole of H_2, 1 mole of O_2, and 1 mole of F_2. Which has the largest number of molecules?
	Correct Answer: All the same Wrong Answers: 1 mole of H_2, 1 mole of O_2, 1 mole of F_2
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept

Unit 3_ Question 4	**Canvas Question Type:** Multiple Choice
	Compare 1 mole of H_2, 1 mole of O_2, and 1 mole of F_2. Which has the greatest mass?
	Correct Answer: 1 mole of F_2 Wrong Answers: 1 mole of H_2 1 mole of O_2 All the same
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Unit 3_ Question 5	**Canvas Question Type:** Multiple Choice
	Which contains the greatest number of oxygen atoms: 1 mol of ethanol (C_2H_5OH), 1 mol of formic acid (HCO_2H), or 1 mol of water (H_2O)?
	Correct Answer: 1 mol of formic acid (HCO_2H) Wrong Answers: 1 mol of ethanol (C_2H_5OH) , 1 mol of water (H_2O), All the same
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Unit 3_ Question 6	**Canvas Question Type:** Multiple Choice
	Which contains the greatest number of carbon atoms: 1 mol of ethanol (C_2H_5OH), 1 mol of formic acid (HCO_2H), or 1 mol of water (H_2O)?
	Correct Answer: 1 mol of ethanol (C_2H_5OH) Wrong Answers: 1 mol of formic acid (HCO_2H), 1 mol of water (H_2O), All the same
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Unit 3_ Question 7	**Canvas Question Type:** Multiple Choice
	Which contains the greatest mass of oxygen: 1 mol of ethanol (C_2H_5OH), 1 mol of formic acid (HCO_2H), or 1 mol of water (H_2O)?
	Correct Answer: 1 mol of formic acid (HCO_2H) Wrong Answers: 1 mol of ethanol (C_2H_5OH) , 1 mol of water (H_2O), All the same
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept

Unit 3_ Question 8	**Canvas Question Type:** Formula
	Calculate the molar mass of $C_{[a]}H_{[b]}N_{[c]}O_{[d]}$
	(12.01*a)+(1.008*b)+(14.007*c)+(15.999*d) Let [a] = 7-12 (vary by 1), let [b] = 9-15 (vary by 1), let [c] = 3-6 (vary by 1), and let [d] = 2-8 (vary by 1).
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Unit 3_ Question 9	**Canvas Question Type:** Formula
**	How many moles of the herbicide Treflan ($C_{13}H_{16}N_2O_4F$) are in [a] lb? (1 lb = 454 g)
	(a*454)/283.27 Let [a] = 20.0 – 40.0 (vary by 0.1)
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Video	Youtube: https://youtu.be/cnf71MBdLTQ Gdrive: https://drive.google.com/file/d/1AOI5UdT2EmwUPFFhnlE4cfheE_7-Geyi/view?usp=sharing
Unit 3_ Question 10	**Canvas Question Type:** Formula
	What is the mass (in kg) of [a] moles of glucose ($C_6 H_{12} O_6$)?
	0.18015*a Let [a] = 600.0 – 700.0 (vary by 0.1)
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Video	Youtube: https://youtu.be/_jAZS7bbOdE Gdrive: https://drive.google.com/file/d/1rhKKvRwr4T0CI3ipWBu7XM-8HwYkspjl/view?usp=sharing
Unit 3_ Question 11	**Canvas Question Type:** Formula
	Determine the mass (in g) of [a] moles of $O_{[b]}$
	15.999*a*b

	Let [a] = 0.100-0.900 (vary by 0.001) and let [b] = 2 or 3
Read More	https://openstax.org/books/chemistry-2e/pages/3-1-formula-mass-and-the-mole-concept
Unit 3_ Question 12	**Canvas Question Type:** Multiple Choice
**	How many hydrogen atoms are in the empirical formula of a compound with the following composition: 40.0% carbon, 6.7% hydrogen, and 53.3% oxygen?
	Correct Answer: 2 Wrong Answers, 1, 3, 4, 5, 6
Read More	https://openstax.org/books/chemistry-2e/pages/3-2-determining-empirical-and-molecular-formulas
Video	Youtube: https://youtu.be/nxrv4NpBIO4 Gdrive: https://drive.google.com/file/d/1hAu_cNGS-cAl_DPbqZhcHa9FtUe7nCDM/view?usp=sharing
Unit 3_ Question 13	**Canvas Question Type: Multiple Choice**
**	Several chemicals used in dry-cleaning consist of carbon, hydrogen, and chlorine. One of these compounds has a molar mass of 198 g/mol. Analysis of a sample shows that it contains 24.3% carbon and 4.1% hydrogen. How many chlorine atoms are there in a molecule of this compound based on its molecular formula?
	Correct Answer: 4 Wrong Answers: 1,2,3,5,6
Read More	https://openstax.org/books/chemistry-2e/pages/3-2-determining-empirical-and-molecular-formulas
Video	Youtube: https://youtu.be/tO9wtZx6v_E Gdrive: https://drive.google.com/file/d/1YL2FSGsuLKHQ5PW0tBbTdW5C29uIT4GA/view?usp=sharing
Unit 3_ Question 14	**Canvas Question Type: Multiple Choice**
	A major textile dye manufacturer developed a new yellow dye. The dye has a percent composition of 75.95% C, 17.72% N, and 6.33% H by mass with a molar mass of about 240 g/mol. How many nitrogen atoms are there in a molecule of this compound based on its molecular formula?

	Correct Answer: 3
	Wrong Answer: 1,2,4,5,6
	https://openstax.org/books/chemistry-2e/pages/3-2-determining-empirical-and-molecular-formulas
Unit 3_ Question 15	**Canvas Question Type: Formula**
	Determine the molarity of [a] mol of in [b] mL of solution
	a/(0.001*b) Let [a] = 0.400-0.600 (vary by 0.001) and let [b] = 400-600 (vary by 1).
	https://openstax.org/books/chemistry-2e/pages/3-3-molarity
Unit 3_ Question 16	**Canvas Question Type: Formula**
**	Determine the molarity of [a] kg of $CuSO_4 \cdot 5H_2O$ in [b] L of solution
	(a*4.005)/b Let [a] = 2.00-4.00 (vary by 0.01) and let b = 1.200-1.700 (vary by 0.001)
	https://openstax.org/books/chemistry-2e/pages/3-3-molarity
	Youtube: https://youtu.be/sgTbxvrBHcI Gdrive: https://drive.google.com/file/d/1UyPFx7tkYcnh6E6zAEtYMq_e7FBIaJna/view?usp=sharing
Unit 3_ Question 17	**Canvas Question Type: Formula**
	What is the mass (in g) of the glucose ($C_6H_{12}O_6$) delivered by intravenous injection if a [a] L bag of [b] M glucose is used?
	a*b*180.156 Let [a] = 0.400-0.600 (vary by 0.001) and let [b]=0.250-0.350 (vary by 0.001).
	https://openstax.org/books/chemistry-2e/pages/3-3-molarity
Unit 3_ Question 18	**Canvas Question Type: Formula**
	What volume (in mL) of a [a] M $Fe(NO_3)_3$ solution can be diluted to prepare 100 mL of a solution with a concentration of [b] M?

	100*(b/a)
	Let [a] = 1.00-2.00 (vary by 0.01) and let [b] = 0.150-0.350 (vary by 0.001)
Read More	https://openstax.org/books/chemistry-2e/pages/3-3-molarity
Unit 3_ Question 19	**Canvas Question Type: Formula**
**	A [a] L bottle of a solution of concentrated HCl was purchased for the general chemistry laboratory. The solution contained [b] g of HCl. What is the molarity of the solution?
	Answer: (b/36.46)/a
	Let [a] = 1.50-3.00 (vary by 0.01) and let [b] = 800.0-850.0 (vary by 0.1)
Read More	https://openstax.org/books/chemistry-2e/pages/3-3-molarity
Unit 3_ Question 20	**Canvas Question Type: Formula**
	The US Environmental Protection Agency (EPA) places limits on the quantities of toxic substances that may be discharged into the sewer system. Limits have been established for a variety of substances, including the dichromate ion, which is limited to [a] mg/L. If an industry is discharging hexavalent chromium as potassium dichromate ($K_2Cr_2O_7$), what is the maximum permissible molarity (in µM) of that substance?
	(3.4*a)
	Let [a] = 0.450-0.600 (vary by 0.001)
Read More	https://openstax.org/books/chemistry-2e/pages/3-3-molarity