Science

Course: Pre-AP Chemistry			Designated Six Weeks: Sixth Six Weeks		
Units: Gas Laws, Nuclear Chemistry			Class Periods to teach: 15 Days		
TEKS/Prerequisites	**Guiding Questions**	**Assessment**	**Vocabulary**	**Instructional Strategies/ELPS**	**Resources/ Weblinks**
Gas Laws					**Days to Teach: 6 Days**
TEKS (*COLLEGE READINESS*): 9A, 9B, 9C (9) Science concepts. The student understands the principles of ideal gas behavior, kinetic molecular theory, and the conditions that influence the behavior of gases. The student is expected to: (A) Describe and calculate the relations between volume, pressure, number of moles, and temperature for an ideal gas as described by Boyle's law, Charles' law, Avogadro's law, Dalton's law of partial pressure, and the ideal gas law ***(EOC Readiness Standard)*** (B)Perform stoichiometric calculations, including determination of mass and volume relationships between reactants and products for reactions involving gases ***(EOC Supporting Standard)*** (C) Describe the postulates of kinetic molecular theory ***(EOC Supporting Standard)***	**Guided Questions:** How do you use gas laws to calculate volume, pressure and temperature change? At constant temperature, how is pressure affected by volume and vice versa? How do you calculate partial pressure? What are the assumptions of the kinetic molecular theory? **Specificity:** Temperature (Celsius vs Kelvin) Particle number (Avogadro's number) Pressure (Pressure unit conversions) Volume	A 4.0L container is filled with 2.0 mol O_2 and 3.0 mol N_2 at STP. Find the partial pressure of each gas.	Combined Gas Law The Ideal-Gas Equation Universal Gas constant, R Universal Gas Law Partial Pressure STP – Standard Temperature and Pressure	Lab: Mass/Volume Hydrogen Lab: Mass/Volume Requirements **ELPS:** http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html 2D – Cornell notes 4F – graphic organizers 4K – labs 5G – comprehension strategies	Textbook: Chemistry the Central Science, Brown and Lemay, Pearson 2000 Gas Law Simulator http://phet.colorado.edu/en/simulation/gas-properties KMT of Gases http://www.absorblearning.com/media/item.action;jsessionid=A2BD56D038204E3E3AC386FF32941944?quick=17e Boyle's Gas Laws http://www.grc.nasa.gov/WWW/K-12/airplane/aboyle.html Gay – Lussac Laws http://www.grc.nasa.gov/WWW/K-12/airplane/aglussac.html Ideal Gas Laws http://jersey.uoregon.edu/v

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College and Career Readiness Standards I. Properties and behavior of gases, liquids, and solids. 3. Understand principles of ideal gas behavior and kinetic molecular theory. 4. Apply the concept of partial pressures in a mixture of gases 6. Understand the effect of vapor pressure on changes in state; explain heating curves and phase diagrams. 7. Describe intermolecular forces.	Gas law constant Discuss the Kinetic Molecular Theory of Gases with regard to the nature of gases and varying conditions Explain the importance of and use STP when applying the gas laws Graph relationships expressed by the gas laws Explain important gas laws and use them in calculations: Charles's law, Gay-Lussac's Law, Boyle's law, The combined gas law, Dalton's law of partial pressures				lab/Piston/index.html
Nuclear Chemistry					**Days to Teach: 6 Days**
(12) Science concepts. The student understands the basic processes of nuclear chemistry. The student is expected to: (A) describe the characteristics of alpha, beta, and gamma radiation; ***(EOC Supporting Standard)*** (B) describe radioactive decay process in terms of balanced nuclear equations; and ***(EOC Readiness Standard)***	**Guided questions:** What is a half-life? How do you solve half-life problems? What is the difference between fission and fusion? How do you evaluate commercial applications of nuclear chemistry?	Compare and contrast nuclear fusion with nuclear fission in terms of the masses used and the energy produced. How much of a 100.0g sample of Gold-198 is left after 8.10 days if it's half life is 2.70 days	Radioactivity Radioactive Decay Half-life Nuclear Fission Nuclear Fusion	Laying the Foundations Activity 9 (or similar lab) PBS video "Meltdown at Three Mile Island"	Laying the Foundations Resources Guide http://www.youtube.com/view_play_list?annotation_id=annotation_358537&p=937B0E873F58A3D7&feature=iv

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(C) compare fission and fusion reactions. ***(EOC Supporting Standard)*** **Prerequisites** Atomic numbers, subatomic particles ***College and Career Readiness Standards*** K. Nuclear Chemistry 1. Understand radioactive decay.	What are the types of radioactive decay? How do the mass and penetrability of the types radioactive decay compare to one another? **Specificity:** Describe fusion and fission using nuclear reactions Describe the characteristics of alpha, beta, and gamma particles Balance nuclear equations	Balance the following equation: $^{226}_{88}\mathrm{Rn} \rightarrow {}^{222}_{86}\mathrm{Ra} +$ _____ ***a***. $^{4}_{2}\mathrm{He}$ b. $^{1}_{1}\mathrm{H}$ c. $^{1}_{0}n$ d. $^{0}_{-1}e$ Which of the following forms of radiation has the greatest penetrating power? A. Alpha B. Beta C. ***Gamma*** D. Positron Which of the following uses nuclear fusion to produce energy? A. Nuclear reactor B. Linear accelerator C. Nuclear submarine D. ***sun***		Internet nuclear project **ELPS:** http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html 3D – Question Answer 3E - Think, pair, share 4K – lab	http://www.pbs.org/wgbh/amex/three/ Radioactive Dating http://phet.colorado.edu/en/simulation/radioactive-dating-game Detecting Radiation http://www.hps.org/publicinformation/ate/faqs/radiationdetection.html

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Chemistry and your Future					**Days to Teach: 1 Day**
TEKS (*COLLEGE READINESS*): 3A-F (3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to: (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student; (B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials; (C) draw inferences based on data related to promotional materials for products and services; (D) evaluate the impact of research on scientific thought, society, and the environment; E) describe the connection between chemistry and future careers (F) research and describe the history of chemistry and contributions of scientists	**Guiding Questions:** What are some current research findings that help you make informed decisions? How were the present concepts of the atom and the periodic table developed? What impact do CFC, sulfur dioxide, etc. have on the environment? What impact does acid rain have on the environment? What kinds of careers are available in chemistry? **Specificity:** Research the following: a. make informed decisions b. development of atom and the periodic table c. environmental impact of pollutants like CFC, sulfur dioxide, etc.	Describe the impact of chemistry on society. Who are the major contributors of our modern atomic theory?	Atomic Theory Discovery of atomic structure Modern atomic structure Organic chemistry Analytical chemistry Inorganic chemistry Physical chemistry	**ELPS:** http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html 3F – structured conversation 4F – graphic organizers	Careers in Chemistry http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_SUPERARTICLE&node_id=1188&use_sec=false&sec_url_var=region1 Acid Rain http://www.ied.edu.hk/apfslt/v5_issue1/fongmw/index.htm