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Professor Roberts

Chem 501

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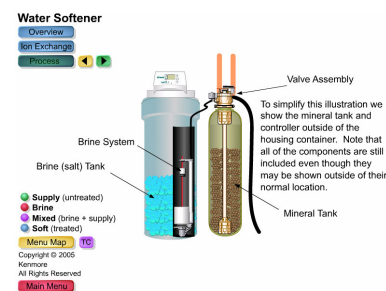
Interactive Chemistry Website Analysis

I teach both Chemistry in the Community and Chemistry I at West York Area High School. Rather than finding multiple websites all on the same topic, my goal for this assignment was to find at least one interactive website that I could incorporate into each of the units I teach. I cover five units in Chemistry in the Community: Water, Materials, Petroleum, and Air, and Nuclear. I teach ten units in Chemistry I: Measurement, Matter, Formulas and Moles, Reactions, Stoichiometry, Acids and Bases, Atoms, Electrons, the Periodic Table, and Bonding. Below are the best websites my group found for each of my units.

Chemistry in the Community

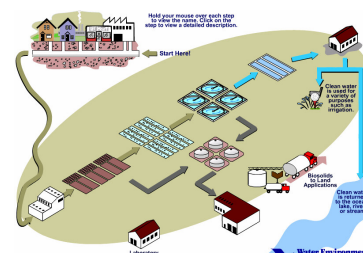
- **Unit 1: Water-**<http://www.kenmorewater.com/website/animations/animations.html>

For the past two years, I have not been able to cover the water purification section in depth because of inservice meetings. This site walks users through all of the stages of a water softener. It is very colorful and interactive. It shows all the ions and how they are replaced. After buttons are pushed, accompanying text explains the particular stage being animated. There are “back” buttons built in so students could review a particular stage as many times as needed. There are 19 different “slides” for the students to navigate. It would be very helpful to have a study guide with questions for the students to answer or a graphic organizer.



- **Unit 1: Water #2-** <http://www.wef.org/apps/gowithflow/theflow.htm>

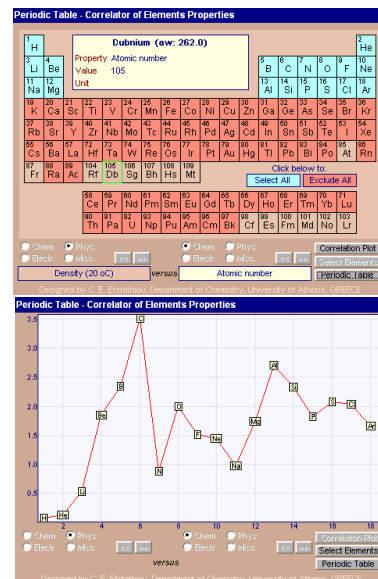
This site was built by the Water Environment Federation. It breaks the water treatment process up into 15 stages. Users can navigate the



treatment plant in sequential order, or they can skip around the plant and focus on a particular stage. Each stage is accompanied by a picture or animation and text. It would be helpful for the students to have a graphic organizer designed like the treatment plant on which they could take notes.

- Unit 2: Materials-** <http://www.chem.uoa.gr/applets/AppletPerTable/AppletPerTable2.html>

Usually I give my student various sets of data for the first 20 elements. I have them plot the data versus atomic number and then analyze any trends they see in comparison with the periodic table. This website easily allows users to make plots of numerous chemical and physical properties. As shown in blue on the periodic table on the right, users can pick which elements they want to graph. An accompanying graphic organizer would give students a place to roughly sketch the graphs and label high and low points. The only down side is that students would not get practice making the graphs. The advantage is that students could spend more time discussing why the trends occur rather than making graphs.



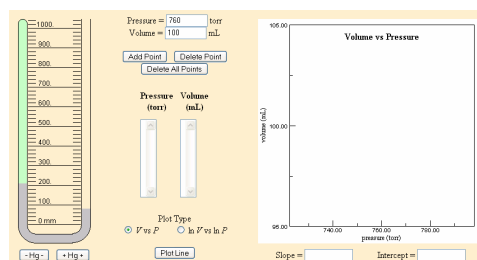
- Unit 3: Petroleum-** <http://www.pslc.ws/macrog/kidsmac/kfloor1.htm>

Normally 75% of the petroleum unit is spent on hydrocarbon fuels, combustion, and alternative fuels. I only spend a couple of days on polymers. This website would give me one more chance to cover polymers and plastics. This website is set up like a shopping mall. Students can pick from 11 different stores. At those stores, students



can learn all about the polymers used to make the products found there. The information section gives some background material and definitions on polymers. There are also links at the bottom of the page where students can learn about other polymer topics and demonstrations. I think students might enjoy a scavenger hunt worksheet where they have to “run through the stores” in search of answers to questions as they learn about polymers.

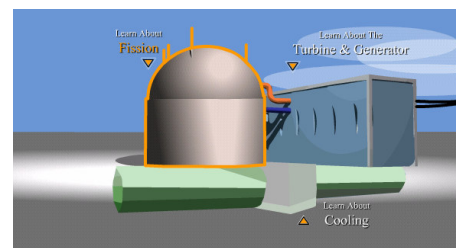
- Unit 4: Gases-** <http://www.chm.davidson.edu/ChemistryApplets/index.html#GasLaws>



This website contains modules on pressure, Boyle's law, Charles's law, Avogadro's law, the ideal gas law, and Dalton's law. There is an introduction and instructions at the beginning of each module. This would be a good activity, especially if there is not enough time or equipment for a hands-on laboratory experiment. It would be helpful for the students to have a worksheet where they could record their data, observations, and conclusions.

- **Unit 6: Nuclear-** <http://www.dom.com/about/stations/nuclear/nuctour.html>

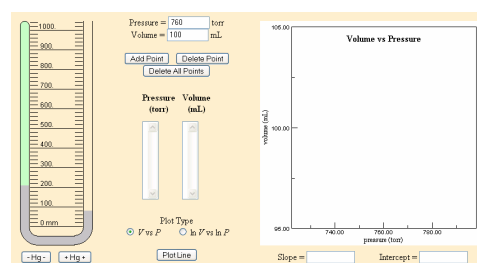
I am required to cover the first four units, so I do not always have time for the nuclear unit. After covering the basics of the nucleus and nuclear reactions, I usually only have time to cover nuclear power plants. In the past, I have shown a video on Three Mile Island. This website allows users to take a tour of a nuclear power plant. It breaks the plant down into three sections: the fission reactor, the turbine and generator, and the cooling process. A graphic organizer would be extremely helpful for students to take notes. It could be set up like a map of the nuclear plant. Students would be expected to summarize what happens at each part of the plant. They can review any section of the plant as necessary and can tour the plant in any order.



Chemistry I

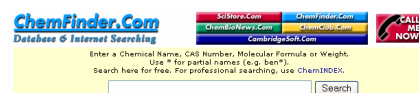
- **Unit 2: Matter-** [See Chemistry in the Community, Unit 4: Gases](#)

In the past, my students covered solids, liquids, and gases; physical and chemical properties; metals, nonmetals, and metalloids; elements and compounds; mixtures; and methods of separation. I would like to include more on the gas laws in this unit.



- **Unit 3: Formulas and Moles-** www.chemfinder.com

I already have lots of practice worksheets for students to learn their ions, write chemical formulas, and name chemical compounds. Sometimes I worry that they learn the concepts but



phosphorus pentoxide (1314-56-3)
Synonyms: diphosphorus pentaoxide; Diphosphorus pentoxide; Phosphoric; phosphoric anhydride; phosphoric pentoxide; Phosphorus oxide; Phosphorus pentoxide; phosphorus pentoxide; PHOSPHORUS PENTOXIDE (PHOSPHOROUS ANHYDRIDE); Phosphorus(V) oxide;

Tools

- [BUY AT CHEM3X.COM](#)
- [VIEW CHEM3X SHEET](#)
- [VIEW CHEM3D MODEL](#)

OpenChem

- [VIEW LINKS](#)
- [ADD COMPOUND](#)
- [ADD CHANGE PROPERTY](#)
- [ADD LINK](#)

CAS RN Lookup

- [THE MESH INDEX](#)
- [NCI DATABASE](#)

Formula	O ₅ P ₂	Molecular Weight	283.89004
CAS RN	1314-56-3	Melting Point (°C)	340
ACX Number	X1002182-6	Boiling Point (°C)	
Density	2.39	Vapor Density	4.9
Refractive Index		Vapor Pressure	
Evaporation Rate		Water Solubility	decomposes

forget that what they are writing has physical significance. I want to use chemfinder with those worksheets so that as students write formulas and name compounds they have to write down a physical or chemical property of that substance. Hopefully it will help them to make the real-world connections.

- **Unit 4: Reactions-** <http://funbasedlearning.com/chemistry/default.htm>

This site has three levels of equation balancing problems that students must solve. The students type in coefficients to the reactants and products to balance the equation. When they think the equation is balanced, they can click the “balanced” button. The students get immediate feedback, and they can keep trying the same reaction until they get it correct. There are worksheets for the teacher to print, so the students can write down their answers and save them for future reference or grading. When students get the reaction balanced, a dialogue box pops up and gives some background information on the particular reaction.

- **Unit 7: Atoms-** http://www.nuclides.net/applets/radioactive_decay.htm

Normally I have students practice nuclear decay problems by having them do worksheet problems. This site really expands how I will present the topic and have the students practice. I can use the brief “About Radioactive Decay” page as the model portion of a POGIL. After reviewing some directed and convergent problems, I would ask the students to write a complete nuclear decay summary for any one of the available nucleotides until the only products left are stable. The time box should be set to at least 10,000ms to give students at least 10 seconds for each stage. By hovering the mouse over a nucleotide, specific radioactive data pops up.



- **Unit 8: Electrons-** <http://www.chm.davidson.edu/ChemistryApplets/AtomicOrbitals/2px.html>

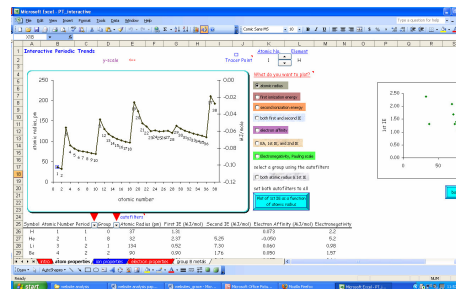
This website has a listing of atomic and molecular orbitals. A VRML viewer such as SGI Cosmo Player is required. The IT people at the school would have to make sure the

Atomic Orbitals							
1s							
2s					2d _x	2d _y	2d _z
3s					3d _x	3d _y	3d _z
4s	3d _x ²	3d _{yz}	3d _{xy}	3d _z ²	3d _x ² -y ²	4d _x	4d _y
	4d _z ²	4d _{yz}	4d _{xy}	4d _z	4d _x ² -y ²		
		4f _{xy} ² -3xz ²	4f _{yz} ² -3xy ²	4f _{yz} ² -3xz ²	4f _x ² -3yz ²	4f _{yz}	4f _{xy} ² -3xz ²

lab top carts had the proper plugins installed. Students can click on different atomic orbitals, 1s-4f, and different hybrid orbitals to see them in three dimensions. The orbitals can also be rotated about the three axes. This activity would not take very long, but it might be a good opening activity. It would be an alternative to having the students look at the orbitals' pictures in the textbook.

- **Unit 9: Periodic Table-** http://academic.pgcc.edu/~ssinex/excelets/PT_interactive_act.pdf

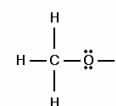
The pdf file works with an embedded Excel file that is set up with graphs, option tabs, etc. that students click on for graphic displays of properties. Clicking on the Excel file in the interactive pdf allows students to download the spreadsheet. Students can manipulate the various features to find answers to the questions posed in the pdf.



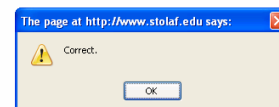
- **Unit 10: Bonding-** <http://www.stolaf.edu/depts/chemistry/courses/toolkits/123/js/lewis/>

During my first two semesters of teaching Chem. I, I have not been able to get through bonding. This website will help students practice drawing Lewis structures while getting immediate feedback. There are 41 compounds to choose from. The website also has the ability to show resonance structures. Students needing extra help can read through the “recommended procedure” on the left of the page.

methanol, CH₃OH



Click on an atom to add or remove lone pairs or on a bond to change its type.



Required Valence Electrons:	For Atoms	Charge (0)	Total
	14	NONE	14
Electrons As Written:	Single Bonds	Lone Pair	Double/Triple Bonds
	10	4	0
			Still Needed
			0

[check structure](#) [show all resonance structures](#)

There is a wealth of interactive chemistry activities on the World Wide Web waiting to be found. Some are more suitable than others. Rather than focusing on one topic in chemistry, my group focused on interactive chemistry sites in general. I took my group's websites and sorted through them so that I found the best one for all but three of the units I teach. After doing a little more research, I am sure I would be able to find interactive sites for measurement and sig. figs., stoichiometry, and acids and bases. Upon finding those sites, I would then focus my attention on getting a stockpile of sites ready to be used in an A.P. chemistry course. I excited to start implementing these sites during the next semester, and I am excited to see how my students respond.