

Atomic Structure and Nuclear Reactions Unit	Major Due Dates:
Plan	Day 12 Group Presentations of draft infographic
September, 2015	Day 14 Final infographics are due to Dr. Davidson
Honors Chemistry	
Dr. Rose Davidson	

Essential Questions:

What is the internal structure of the atom?

How do atoms differ from one another?

How can atoms change?

How have nuclear reactions impacted humans?

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Day	Objectives	Activities	Hom	Homework		
1	Students will be able to describe how the	Video viewing	Read and take notes on section in			
	model of the atom has changed over time.	of "The Atom"	text.			
2	Students will be able to describe how the	Time line	Read	, take notes on Section in text.		
	model of the atom has changed over time.	activity	Com	plete the model timeline.		
3	Students will be able to describe the current	Isotope Lab	Read	, take notes on section in Text		
	model of the atom and be able to explain how		Lab	Calculations due before leaving.		
	isotope are used to calculate atomic mass.					
4	Students will be able to determine the number	Problem	Pract	tice problems due before leaving.		
	of protons, neutrons and electrons in isotopes.	session				
5	Students will be able to describe what	Guided	Read, take notes on section in text.			
	happens to an atom when it radioactively	Discussion				
	decays.					
6	Students will be able to graph parent and	Half Life	Read and take notes on section in			
	daughter isotope samples using the half-life.	Activity	text.			
7	Students will be able to describe the role	Infographic	Deciding on a topic and locating data			
	which nuclear chemistry plays in modern life.	Activity	on nuclear topics			
8	Students will be able to describe the role	Infographic	Crafting graphs for the infographic			
	which nuclear chemistry plays in modern life.	Activity	from the data set.			
9-	Students will be able to describe the role	Infographic	Adding information and images to			
10	which nuclear chemistry plays in modern life.	Activity	the infographic			
11	Students will be able to describe the role	Infographic	Design principles and providing			
	which nuclear chemistry plays in modern life.	Activity	sources			
12	Students will be able to clearly present the	Gallery Walk	Infographics, revised and polished			
	findings of their research to their peers.	Activity	after peer feedback, are submitted to			
			Dr. Davidson for feedback.			
Academic Vocabulary:						
Atom	Electron	Atomic Number Nuclear Decay				

Academic vocabulary.					
Atom	Electron	Atomic Number	Nuclear Decay		
Democritus	Electron Cloud	Mass Number	Radioactivity, Radiation		
Dalton	Nucleus	Isotope	Half life		
Thomson	Proton	Nuclear Symbol	Transmutation		
Rutherford	Neutron	Atomic Mass	Nuclear Fission		
Bohr	Scanning Electron Microscopes	Atomic Mass Unit	Nuclear Fusion		

Assessment: This unit's summative assessments will be the Atomic Theory Time Line Activity and the Gallery Walk presentations and final infographic submitted on Nuclear Topics.











Nuclear Reactions in Modern Life Infographic Project Dr. R. Davidson, Fall 2015

Objective:

Students will be able to describe the nuclear reactions which impact modern life using an infographic.

Student Directions:

- 1. Working with a partner, you will choose a topic related to nuclear reactions to research.
- 2. You will then locate a credible data source to provide statistics on your chosen topic.
- 3. The data source will be probed to determine mathematical relationship(s) in the data.
- 4. The relationship(s) in the data, along with textual explanations and images to illustrate will be assembled into an infographic.
- 5. Your research gathered and then assembled onto the infographic should address the following questions about the nuclear process chosen:
 - a. What is the topic about? How are nuclear reactions involved with the topic?
 - b. What do the statistics demonstrate in terms of the scale of involvement, the extent of use or problems with the use, concerns or benefits for citizens?
 - c. What should citizens know about this topic in order to make informed decisions?
- 6. The infographic will be crafted using Venngage and Codap. The final infographic will be saved as a pdf and uploaded through Blackboard. The full sources of the information and pictures used are cited on a separate word document which is also uploaded through Blackboard.
- 7. The infographic will be presented visually and orally to the class for feedback.
- 8. The quality of the sources used for your information, the quality of the information presented, the quality of the infographic itself and the quality of your presentation to the class, are all features which will impact your grade on this project. Details can be found on the Specification Sheet.

Topic ideas:

1441471, IIS-1441481, & DRL-0822354

A.	Half-lives of radioactive elements most often used in our lives.	B.	What are the radioactive elements and where are they found?	
C.	Radiation exposure levels of various activities such as airplane travel and x-rays	D.	D. The production of energy on the Sun	
E.	The use of radiation to treat cancer	F.	The use of radioactivity to diagnose cancer	
G.	Radon gas in our homes	H.	The use of nuclear fission to produce electricity: pros and cons	
I.	Sources of uranium for nuclear power plants and weapons	J.	Transportation of nuclear fuel and wastes	
K.	Security concerns with nuclear power	L.	The Calloway County nuclear power plant: Nuclear energy in Missouri	
M.	The use of nuclear fission in making nuclear warheads or bombs	N.	Decommissioning of nuclear warheads, weapons	
Ο.	The concerns about nuclear wastes	P.	Locations of nuclear waste sites	
Q.	Radioactive hazardous waste sites	R.	Nuclear catastrophes that have happened in the past: Fukushima	
S.	Nuclear catastrophes that have happened in the past: Chernobyl	T.	Nuclear catastrophes that have happened in the past: Three Mile Island	
U.	How is nuclear power currently being used in the US?	V.	What are the future plans for using nuclear fission to generate electricity in the US?	

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	Websites containing Data and Information on Nuclear Topics				
Source					
NIST	Half-life data	http://www.nist.gov/pml/data/halflife.cfm			
EPA	Radon data and	http://www.epa.gov/radon/index.html			
LIT	info	http://www.cpa.gov/radon/index.html			
WNO	Sources of	http://www.world-nuclear.org/info/Safety-and-Security/Radiation-and-			
*****	radioactive	Health/Naturally-Occurring-Radioactive-Materials-NORM/			
	materials	http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Uranium-			
	materials	Resources/Supply-of-Uranium/			
NRC	Radioactive	http://www.nrc.gov/waste.html			
TVICE	wastes	http://www.nrc.gov/waste/llw-disposal/licensing/statistics.html			
GAO	Radioactive	http://www.gao.gov/key issues/disposal of highlevel nuclear waste/issue s			
0710	Wastes	ummary			
NIH	Radon and	http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=27			
1111	Cancer, Radiation	http://www.niehs.nih.gov/health/topics/agents/radon/			
	levels, x-ray	http://www.mens.mm.gov/neutal/topics/agents/radon/			
	statistics				
FAS	Status of world	http://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/			
1710	nuclear forces	http://tus.org/bbucs/nuclear weapons/bucus world nuclear forces/			
CDC	Number of x-ray	http://www.cdc.gov/nchs/data/public_health/SeriesB_38.pdf			
CDC	visits	http://www.ede.gov/hens/dddd/pdole_hedidi/genesb_50.pdf			
ANS	Radiation dose	http://www.ans.org/pi/resources/dosechart/			
71115	chart	ittp://www.ans.org/ph/tesources/dosechard			
NASA	Information about	http://helios.gsfc.nasa.gov/qa_sun.html			
1471571	the sun's energy	http://honos.gsrc.husu.gov/qu_sun.html			
NRDC	Archive of	http://www.nrdc.org/nuclear/nudb/datainx.asp			
MADE	Nuclear weapons	http://www.nrdc.org/nuclear/			
	data	http://www.inde.org/ndeledi/			
NRDC	Nuclear fallout	http://www.nrdc.org/nuclear/fallout/			
Me	regions for US	http://www.indo.org/hdoled/fdifodd			
	plants				
Breast	Risk of	http://www.breastcancer.org/symptoms/understand_bc/risk/understanding			
Cancer.or	developing breast	integral with the constraint of the constraint o			
g	cancer				
ACS	Breast cancer	http://www.cancer.org/acs/groups/content/@editorial/documents/document/ac			
1105	facts and figures	spc-044552.pdf			
Cancer.or	Mammography	http://www.cancer.org/research/infographicgallery/mammography-statistics			
g	statistics				
CDC	Fast stats	http://www.cdc.gov/nchs/fastats/mammography.htm			
	mammography				
	and breast cancer				
NRC	High value data	http://www.nrc.gov/data/			
- 1.10	sets on nuclear				
	reactors				
		I			









WNO	Transportation of nuclear wastes	http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Transport/Transport-of-Radioactive-Materials/	
NEI	Nuclear waste	http://www.nei.org/Knowledge-Center/Nuclear-Statistics/On-Site-Storage-of-Nuclear-Waste	
		http://www.nei.org/Knowledge-Center/Nuclear-Statistics/On-Site-Storage-of-	
		Nuclear-Waste/US-State-by-State-Used-Fuel-and-Payments-to-the-Nu	
NRC	Security and	http://www.nrc.gov/waste/spent-fuel-transp.html	
NEI	transportation of	http://www.nei.org/Issues-Policy/Nuclear-Waste-Management/Transportation	
NIET	nuclear fuel		
NEI	Nuclear Statistics	http://www.nei.org/Knowledge-Center/Nuclear-Statistics	
WNO	Information and	http://www.nei.org/Knowledge-Center/Nuclear-Statistics/World-Statistics http://www.world-nuclear.org/	
WNO	statistics on	http://www.worid-nuclear.org/	
	nuclear power		
ICAN	International	http://www.icanw.org/	
	campaign to	Check "the Facts" tab	
	abolish nuclear		
	weapons		
NRC	Decommissioning	http://www.nrc.gov/waste/decommissioning.html	
	nuclear facilities		
EIA	Nuclear power in	http://www.eia.gov/nuclear/state/2008/missouri/	
NDC	Missouri	1.4. // // // // // // // // // // // // //	
NRC	Callaway County Reactor in MO	http://www.nrc.gov/info-finder/reactor/call.html	
Nature	Fukushima	http://www.nature.com/news/fukushima-data-show-rise-and-fall-in-food-	
rvatare	radioactivity in	radioactivity-1.17016	
	food		
Fukushim	Thyroid cancer	http://www.fukushimawatch.com/2015-07-29-second-post-as-test-by-	
a Watch	and Fukushima	moshin.html	
WNN	The situation at	http://www.world-nuclear-	
	Fukushima	news.org/RS_Data_on_Fukushima_radiation_monitoring_1809121.html	
WHO	Health effects of Chernobyl	http://www.who.int/ionizing_radiation/chernobyl/backgrounder/en/	
NEI	Chernobyl	http://www.nei.org/master-document-folder/backgrounders/fact-	
	disaster and its	sheets/chernobyl-accident-and-its-consequences	
	consequences		
NRC	Background on	http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html	
CI	Three Mile Island	1. (to a //a manaille a manaille 1. 1. (to a //a	
SI	Exhibit about three mile island	http://americanhistory.si.edu/tmi/	
3 mile	Health studies on	http://www.threemileisland.org/science/what_went_wrong/	
island	what happened at	http://www.tinecrimerstand.org/science/what_went_wrong/	
org	3 mile island		
NIH	A re-evaluation of	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1469835/pdf/envhper00314-	
	the health effects	0052.pdf	
	the hearth effects	<u>0032.pdi</u>	

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Specifications for the Nuclear Infographics					
Content	20 points = Outstanding coverage				
Summarize briefly the concept in your own words; how the process takes					
place or what the topic is about.					
Describe briefly the nuclear reaction involved with the process.					
Statistics provided in the form of a graph, pie chart, histogram, bubble					
chart.					
Relationship demonstrated by the statistics is clearly presented.					
Provide the information needed by citizens about this topic in order to					
make informed decisions.					
Infographic	20 points = Outstanding visual presentation				
Limit descriptions to 25 words per text box.					
Pictures are either copyright free or student taken or created originals					
Pie charts, graphs, histograms, bubble charts are labeled appropriately					
and contain a sufficient number of data points.					
Design elements are used to provide cohesiveness and interest to the					
infographic.					
Oral Presentation	5 points = Outstanding presentation				
The topic is presented clearly and succinctly					
Students do not present material in question answer format, nor do they					
simply follow the organization of the questions given.					
Both students participate equally					
Eye contact is maintained with the audience					
Presenters are dynamic and prepared					
Additional information and creative elements are included beyond those					
required.					
Sources used	5 points = Perfectly attributed				
Four sources other than the textbook are used and cited on a work cited					
document.					
URL is provided for online sources.					
The sources used are credible and appropriate to the topic.					
All images are copyright free and the name of the source cited beneath					
the picture in tiny font.					
Original artwork, images should be cited with the student name beneath					
the image.					
Final copy uploaded as PDF on Blackboard	Total = 50 points				





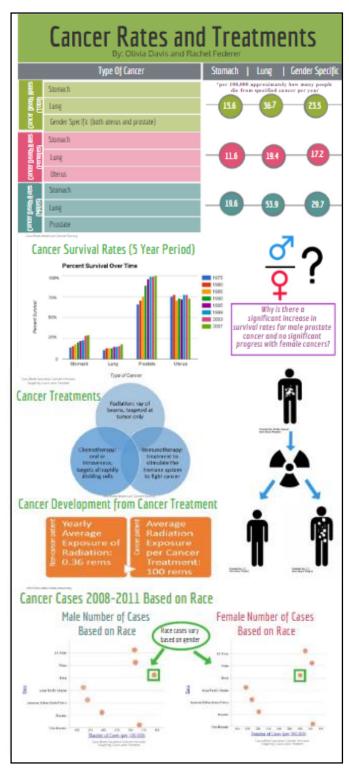








Examples of Student Work



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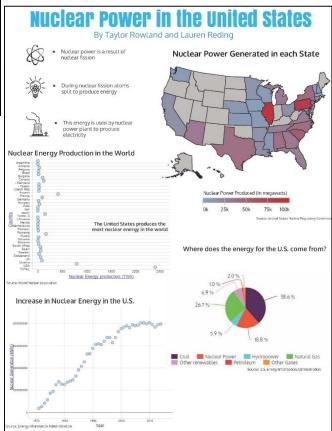












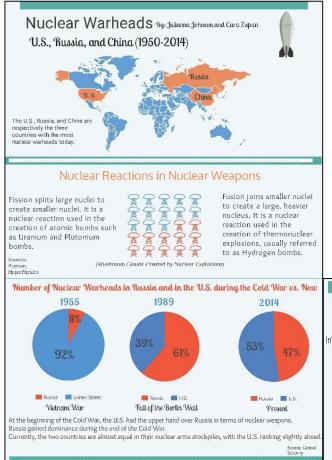












The History Behind the Numbers U.S. Initial and current leader in nuclear warhead production First and only country to deploy nuclear bombs Russia Longtime nuclear weapons competitor of the U.S. Number of nuclear warheads currently ranks second in the world China Developed limited nuclear warhead capabilities in 1964 Stockpiles of nuclear weapons have remained at a plateau for about 30 years. Sources: Arms Control Association, Ploughshares Fund Nuclear Warheads in the U.S., Russia, and China vs. Year Russia and the U.S. still harbor great numbers of nuclear arms despite decommissioning efforts. The U.S. is decommissioning Nuclear Warheads in at a much slower the U.S. rate than Russia is. Russia, and China China has not decommissioned and continues to harbor a small but consistent number of nuclear weapons. Source: Bulletin of Atomic Scientis

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