

## Nuclear Science

WHEN	WHAT	HOW
<b>Monday Day 1</b>		
Morning	Pre-Assessment Introductions, Index Cards LAB safety form, Computer usage History of Physics, the road to Nuclear Science	Test
Afternoon	Physics quantities, SI and derived units, powers of ten Dimensional analysis, unit conversions, J and eV	Lab
Evening	Ch 1 in textbook, problems end of chapter	
<b>Day 2</b>		
Morning	Periodic Table of elements, atomic number, atomic mass Isotopes, Isotones, Isobars Standard model Marshmallows nuclei, nuclear reactions	Lecture  Class discussions Hands-on activity
Afternoon	Nuclear reactions, fusion and fission, chart of nuclides Atomic challenge game	Lab
Evening	Problems and discussions of atomic mass vs atomic weight Newton's laws	
<b>Day 3</b>		
Morning	Fundamental forces, Binding Energy (BE) Calculate the BE, in groups and alone, present and discuss solutions at the board	Lecture Class discussions
Afternoon	Rutherford scattering simulation (game) (computer simulation, too)	LAB
Evening	Problems from ch 2, and present the problems at the board	
<b>Day 4</b>		
Morning	Models for nuclear arrangement Circular motion, electromagnetic forces, right hand rules Particle accelerators: cyclotrons, ...	Lecture Class discussions
Afternoon	Particle accelerators problems Fragmentation box simulation	LAB
Evening	Research project on particle accelerators Classroom presentations	

<b>Friday Day 5</b>		
Morning	Problems and discussions about particle accelerators "LHC rap"; nucleus vs atom size Nucleus Factory, how the chart of nuclides is created Types of radioactive decays	Lecture Class discussions
Afternoon	decays series for Uranium and Thorium to stability Nucleosynthesis game	LAB
Evening		
<b>Sunday Day 6</b>		
Morning		
Afternoon		
Evening	Nuclear energy; problems from ch 4 Isotope BINGO game	
<b>Day 7</b>		
Morning	QUIZ energy yield from nuclear reactions, J, eV, MeV, GeV Radioactive decays (alpha, beta, gamma, e capture, n capture)	Quiz
		Lecture Class discussions
Afternoon	Radioactivity half-life simulation Collect data (dice) and calculate half-life	LAB
Evening	Review the log graphs and find the decay constant from slope Exercises and problems from ch 3	
<b>Day 8</b>		
Morning	Revisit and review the law of radioactive decay Radioactive detectors research project	Lecture Class discussions
Afternoon	Presentations the projects Cardboard match chain reaction	
Evening	Mass spectroscopy Exercises and problems with decay law (worksheet)	
<b>Day 9</b>		
Morning	Carbon-14 dating problems with carbon dating, finding the age	Lecture Class discussions

Afternoon	Modern physics famous experiments research projects presentations	
Evening	Phet simulations on various experiments Modern Physics experiments animations	e-LAB
<b>Day 10</b>		
Morning	Nuclear fusion and nuclear fission Nuclear power plants components, how it works Three Mile Island, Chernobyl, Fukushima	Lecture Class discussions
Afternoon	Intruduce the Nuclear power DEBATE Research	
Evening	Radiation exposure and units: Bq, Ci, rad, rem, Sv EPA website, annual radiation dose	
<b>Friday Day 11</b>		
Morning	Rhode Island University - Nuclear reactor FIELD TRIP	
Afternoon	Rhode Island University - Nuclear reactor FIELD TRIP	
Evening		
<b>Sunday Day 12</b>		
Morning		
Afternoon		
Evening	How a nuclear reactor works, various types Computer simulation	
<b>Monday Day 13</b>		
Morning	Nuclear medicine Nuclear instruments used in diagnostics, reasearch project Presentation of projects	Lecture Class discussions
Afternoon	Rhode Island Hospital FIELD TRIP	

Evening	The Manhattan Project documentary	
<b>Tue Day 14</b>		
Morning	World War II and the development of the atomic bomb Nuclear weapons	Class discussions
Afternoon	"Day One" the movie	
Evening	"Day One" the movie	
<b>Wed Day 15</b>		
Morning	Nuclear power plant security measures Nuclear laws, rules and regulations, terrorism Final projects for the showcase	Class discussions
Afternoon	Final projects for the showcase	
Evening	Nuclear power plant DEBATE along with Biotechnology class	DEBATE
<b>Thur Day 16</b>		
Morning	Final review of all material Post test	Class discussions Test
Afternoon	Academic fair (showcase) setup	
Evening		
<b>Friday Day 17</b>		
Morning	"Fat Man and Little Boy" the movie ??? Academic fair (showcase) presentations Parent conferences	
Afternoon	Parent conferences	
Evening		