01: Nuclear Physics

Content Area: **Science**
Course(s): **AP Physics 2**
Time Period: **September**
Length: **1**
Status: **Published**

Enduring Understandings:

- Antimatter is the same as matter except the charge is backward.
- Half life is a way to see how quickly an isotope will decay.
- Mass and Energy are interchangeable.
- Protons and Neutrons are Made of Quarks
- Some Isotopes are not stable
- The types of decay are consistent with creating more stability.
- There are 4 fundamental forces that govern the universe. Nuclear Strong holds the nucleus together and Nuclear Weak flips quarks.

Essential Questions:

- What are the fundamental forces that govern the universe?
- What are the fundamental particles that exist in the universe?

Lesson Titles:

- Binding Energy
- Fission
- Fundamental Forces and Particles
- Fusion
- Half Life
- Stability
- Types of Decay

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Inter-Disciplinary Connections:

LA.RH.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, qualitatively, as well as in words) in order to address a question or solve a problem.
LA.RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
LA.RST.11-12.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LA.WHST.11-12.1.A	Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
LA.WHST.11-12.1.B	Develop claim(s) and counterclaims using sound reasoning and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.
LA.WHST.11-12.1.C	Use transitions (e.g., words, phrases, clauses) to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
LA.WHST.11-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
LA.WHST.11-12.2.E	Provide a concluding paragraph or section that supports the argument presented.
LA.WHST.11-12.10	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- Chromebook Activity
- Independent Studies
- Lectures on Fundamental Forces and Particles, Binding Energy, Stability, Half Life, Types of Decay, Fission, Fusion
- Problem Solving
- Science Labs

Modifications

Formative Assessment:

- Anticipatory Set
- Closure

- Quizzes on Fundamental Forces and Particles, Binding Energy, Stability, Half Life, Types of Decay, Fission, Fusion
- Warm-Up

Summative Assessment:

- Alternate Assessment
- Benchmark assessment on Nuclear Physics
- Marking Period Assessment

Alternative Assessments:

Performance tasks
Project-based assignments
Problem-based assignments
Presentations
Reflective pieces
Concept maps
Case-based scenarios
Portfolios

Benchmark Assessments:

Skills-based assessment
Reading response
Writing prompt
Lab practical

Resources & Materials:

- https://sites.google.com/site/delseaphysics1/Home